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USDA Human Nutrition Research and Education

Fiscal Year 1995
Report to Congress

United States
Department of
Agriculture

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This report was reviewed by the USDA Annual Report Evaluation Task Force, which consists of the following members: Suzanne P. Murphy, chair, University of California, Berkeley; Jeanne Goldberg, Tufts University; Audrey Maretzki, Pennsylvania State University; Bee Marks, Ketchum Public Relations; Bernestine McGee, Southern University; Grace Ostenso, U.S. Department of Health and Human Services; and Peter Reeds, Children's Nutrition Research Center, Baylor College of Medicine.

While supplies last, single copies of this publication may be obtained at no cost from Jacqueline Dupont, chairperson, USDA Human Nutrition Coordinating Committee, BARC–West, Building 005, Room 332, Beltsville, MD 20705.

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Abbreviations

AMS	Agricultural Marketing Service
ARS	Agricultural Research Service
CES	Cooperative Extension System
CNPP	Center for Nutrition Policy and Promotion
CPI	Consumer Price Index
CSFII	Continuing Survey of Food Intakes by Individuals
CSFP	Commodity Supplemental Food Program
CSREES	Cooperative State Research, Education, and Extension Service
DHKS	Diet and Health Knowledge Survey
EFNEP	Expanded Food and Nutrition Education Program
EPA	U.S. Environmental Protection Agency
ERS	Economic Research Service
FCS	Food and Consumer Service
FDA	Food and Drug Administration
FDPIR	Food Distribution Program on Indian Reservations
FMNP	Farmers' Market Nutrition Program
FNIC	Food and Nutrition Information Center
FSIS	Food Safety and Inspection Service
FSQ	Food Safety and Quality, from the National Food Safety and Quality Initiative Program
FY	fiscal year
HHS	U.S. Department of Health and Human Services
NAL	National Agricultural Library
NDL	Nutrient Data Laboratory
NEFLE	National Exchange for Food Labeling Education
NET	Nutrition Education and Training Program
NuMenus	Nutrient Standard Menu Planning
PDP	Pesticide Data Program
USDA	U.S. Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

Preface

In accordance with the provisions of section 1452 (b) of the National Agricultural Research, Extension, and Teaching Policy Act Amendments of 1985 (7 USC 3173 note), this report on the human nutrition research and education activities of the U.S. Department of Agriculture (USDA) for fiscal year (FY) 1995 is hereby submitted. This is the ninth annual report that features directions and highlights without restating the Department's detailed plan outlined in the report submitted in 1986.

The FY 1995 report is organized somewhat differently from past reports. A task force representing academia, industry, and government was convened to provide advice on the format and content of the report. The members recommended the report be divided into two sections, with the first section summarizing collaboration among USDA agencies on one important subject and the second section highlighting accomplishments within each agency. The focus for the collaborative section is child nutrition.

USDA conducts many activities in response to legislation. A summary of the legislation relating to human nutrition is presented in appendix A.

Child Nutrition Activities

The focus on child nutrition in this report was selected in part because of activities that enhanced the school meals programs. These are particularly exciting innovations targeting better health for our children. Three stages of childhood are discussed: infancy, early childhood, and school age. Of particular importance are activities of the School Meals Initiative for Healthy Children and the ensuing Team Nutrition activities, continuing and expanded nutrition education programs targeting children and their care givers, intensified activities to promote food safety for families, research discoveries that make an impact on the nutritional health of children, and improvements in the food supply that help children follow the Dietary Guidelines for Americans.

USDA activities in the area of nutrition education and research are comprehensively summarized in the second section of this report. Eight agencies report activities:

- Agricultural Marketing Service (AMS)
- Agricultural Research Service (ARS)
- Center for Nutrition Policy and Promotion (CNPP)
- Cooperative State Research, Education, and Extension Service (CSREES)
- Economic Research Service (ERS)
- Food and Consumer Service (FCS)
- Food Safety and Inspection Service (FSIS)
- National Agricultural Library (NAL).

Funding Levels

The actual or estimated expenditures for human nutrition research, monitoring, and education for fiscal years 1986–95 are given in appendix B. The total amount USDA spent on human nutrition research and monitoring support increased from $60.7 million in FY 1986 to $76.1 million in FY 1992, and has since decreased to $74.7 million in FY 1995, a net increase of 23 percent. (If adjusted for inflation, USDA expenditures for research and monitoring in 1995 are 11 percent below those in 1986.) During the same period, USDA support for human nutrition education increased 147 percent, from $132.7 million in 1986 to $327.9 million in 1995. Most of the funds were distributed to state health and nutrition agencies. The combined USDA support for human nutrition research, monitoring, and education in FY 1995 was $402.6 million.

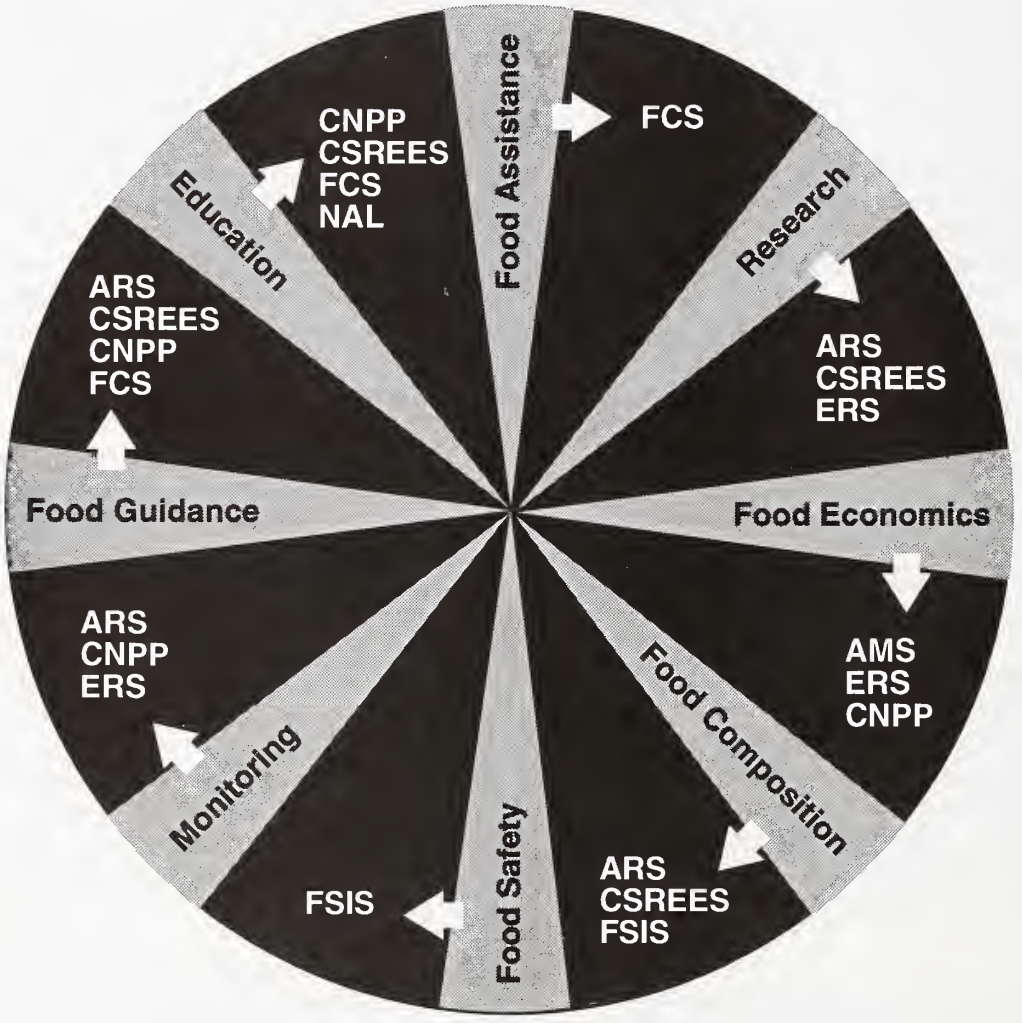
Coordination and Advisory Mechanisms

Coordination of nutrition activities among USDA agencies continued to be through the Human Nutrition Coordinating Committee under the structure enacted in January 1993. Coordination between USDA and other agencies was facilitated by the major interagency groups—the Interagency Board for Nutrition Monitoring and Related Research and the Interagency Committee for Human Nutrition Research. Coordination with the private sector took place with the help of many working and advisory groups.

Eight USDA agencies were involved in nutrition in eight functional areas. Involvement of the same agency in different areas required balancing and communication among agencies (figure 1). This precision resulted in many accomplishments:

- **Food assistance** programs were improved by research and education efforts such as the Nutrition Education Initiative, which targets the neediest participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and Team Nutrition, which assists in implementing the School Meals Initiative for Healthy Children.

Figure 1. The eight USDA agencies involved in human nutrition research and education



- **Research** programs continue to be an integral part of USDA's human nutrition activities. Five USDA human nutrition research centers, as well as regional research centers, located throughout the United States conduct research on a variety of topics. Extramural research, supported through programs such as the National Research Initiative and the Hatch and Evans-Allen Acts, has led to important advances in knowledge about factors that can improve human nutrition.

- Important aspects of **food economics** are a focus. For example, the cost of raising and feeding a child is determined annually, and a recent project studied economic issues associated with food safety.

- **Food composition** data are continually updated by improving methods of food analysis and tracking changes in the food supply. The National Nutrient Database for Child Nutrition Programs is used to assess the nutritional adequacy of school meals.

- Many functions pertaining to **food safety** enhanced the safety of the food supply and families' knowledge about the safe storage and preparation of foods. Some examples include the National Food Safety and Quality Initiative, the Foodborne Illness Education Information Center, and the Meat and Poultry Hotline.

- **Monitoring** the nutritional health of the nation involved analyzing survey data to determine the food and nutrient intakes of Americans. The 1994–96 Continuing Survey of Food Intakes by Individuals was expanded to include more children and more detail on the foods and drinks that children consume. Nutrition professionals use the survey data to guide policy decisions.

- **Food guidance** efforts were greatly enhanced by the development of a 1995 revision of the *Dietary Guidelines for Americans*. The Food Guide Pyramid continues as a cornerstone for nutrition education activities for adults and children.

- **Education** related to healthy dietary choices continues as a focus. For example, the Expanded Food and Nutrition Education Program offers nutrition education programs for low-income families, and the Food Stamp Program provided matching grants in 25 states for the nutrition education of participants.

Figure 2. Giving children a healthy start in life

Nutrition Education for New and Expecting Mothers

The WIC Program provides foods, nutrition education, and access to health care to 6.9 million low-income pregnant and postpartum women, infants, and children under 5.

Nutrition Education Inititative targets the neediest of WIC pregnant women. Improved dietary habits and more of them breast-feed (CSREES)

• Lower Mississippi Delta Nutrition Intervention Research Initiative (ARS). In this region, rural poverty, infant mortality, low-birth-weight infants, and births to teen mothers are among the nation's highest.

Research on Nutrition and Birth Defects

• Birth defects are more common in diabetic pregnancies and may be related to deficiencies of zinc, copper, and magnesium (CSREES). Most diabetes is obesity related.

Research To Prevent Iron-Deficiency

Anemia, a common problem in infants, young women, and children.

• In recently weaned infants, iron supplement is shown to be better absorbed when given with juice than cow's milk (ARS).

• Investigation of causes of iron-deficiency anemia in WIC children (FCS).

Research on Infant Protein Needs

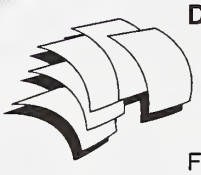
• Premature infants differ from full-term infants in their amino acid needs (ARS).

• Milk protein is used more efficiently from breast milk than infant formula (ARS).

Better Maternal Nutrition

Coordinate With Health Care and Social Services

Better Infant Nutrition



Disseminating Findings to Other Health Professionals via scientific journals, meetings, and technical resources (CNPP, FCS, NAL)

Better Health at Birth

Healthier Infants

Activities Highlighting Child Nutrition

Fiscal year 1995 was a year of extensive activity in child nutrition. The activities presented are organized into three areas: (1) maternal and infant nutrition, (2) promotion of high-quality diets for children, and (3) school nutrition programs.

Maternal and Infant Nutrition

Low-birth-weight infants get a poor start in life. Many don't survive early infancy, and those who do are at greater risk of developing health problems. Maternal malnutrition is a major cause of low birth weight. USDA maternal nutrition programs focus on low-income pregnant women at greatest risk of having low-birth-weight babies. Other USDA food assistance programs such as the Food Stamp Program and the Food Distribution Program on Indian Reservations contribute to the improved nutritional status of women and children.

The largest of these programs is the Special Supplemental Nutrition Program for Women, Infants, and Children, known as the WIC program (see pp. 38–41). It provides supplemental foods, nutrition education, and access to health services to over 6.9 million low-income pregnant and postpartum women, infants, and children under age 5 who are at nutritional risk.

The Commodity Supplemental Food Program (CSFP) also targets pregnant and postpartum women and their children under age 6 by providing commodity foods to supplement their diets. CSFP operates at 63 sites in 20 state agencies in areas that do not have a WIC program.

The Nutrition Education Initiative (NEI), a 3-year special project (see p. 38), targets the neediest participants in WIC. NEI supplements the nutrition education provided by the WIC program. Its projects are funded in all 50 states and five territories and are administered at the local level within the Cooperative Extension System. The projects have been successful in improving the nutrition knowledge and dietary habits of this high-risk population, and participants are more likely to breast-feed. USDA monitors and evaluates the progress of the projects as part of its concern with the health costs of poor diets (see pp. 32–33).

Maternal and child nutrition research, a major USDA activity, provides the scientific basis for programs such as NEI. In fact, the USDA has the only federal research facility—the Children's Nutrition Research Center—dedicated to investigating the nutritional needs of children and pregnant and nursing women (see p. 15). USDA also provides grants and contracts for research and evaluation done at other institutions. Collectively, these studies provide a deeper understanding of the importance of good nutrition during pregnancy and infancy; document improved outcomes; and strengthen the resolve to improve the nutrition of low-income, high-risk pregnant women.

Figure 2 shows how USDA's nutrition research and education converge to give children a healthier start in life. Improving the dietary behavior and nutrition knowledge of new and expectant mothers makes for healthier pregnancies, reduces the likelihood of premature deliveries, and results in healthier newborns, increased breast-feeding, and better skills and knowledge to support good nutrition for their children.

Some examples of USDA's nutrition education and research that affect maternal and infant health are listed following:

- Have a Healthy Baby Program (Kansas) helps pregnant teens deal with the daily nutrition and life-style choices that affect a baby's health. The number of low-birth-weight babies born to women enrolled in this program was nearly half that expected for this high-risk population (see p. 29).

- A study shows that protein requirements are high in very-low-birth-weight infants (see p. 17).

- The Great Beginnings Project (New Hampshire) is an intensive nutrition education program targeting a high-risk group of pregnant adolescents and young mothers (see p. 32).

- Research shows that the vitamin B_6 intake of nursing mothers affects the amount of B_6 the infants get through breast milk, and this in turn can affect how alert and vocal the infants are at 6 months of age (see pp. 27–28).

- The Better Mothers and Children Project (Texas) uses compact disk interactive teaching modules in the nutrition education of low-literate WIC participants. The program is written in English and Spanish at a 5th grade reading level or lower, with voice-overs for participants who don't read (see pp. 29–30).

- *Infant Nutrition and Feeding: A Reference Handbook for Nutrition and Health Counselors in the WIC and CSFP Programs* was disseminated to over 8,000 health professionals working in maternal and child health (see p. 39).

- The WIC National Breast-Feeding Promotion Effort is a comprehensive social marketing campaign to increase breast-feeding rates among WIC participants (see p. 39).

Promoting High-Quality Diets for Children

A healthful diet for children age two and older, as well as for adults, is presented in the *Dietary Guidelines for Americans*, which is mandated by Congress and revised

Figure 3. How USDA programs promote high-quality diets for children

Nutrition Monitoring Legislation

- U.S. food composition tables contain more foods consumed by children (ARS).
- Continuing Survey of Food Intakes by Individuals monitors children's intakes (ARS).

Congressional Mandate for Dietary Guidelines

- 1995 update of the Dietary Guidelines (CNPP).
- Interpretation of the Guidelines through the Food Guide Pyramid (CNPP).
- Teaching the Food Guide Pyramid to parents and children (FCS).

Food Labeling Legislation

- Labeling on meat and poultry products (FSIS).

Survey data are used to examine children's diets

- *Healthy Eating Index* summarizes dietary quality (CNPP).
- Socioeconomic variables predict iron intakes (ERS).
- Young children benefit from participating in meal programs (CSREES).
- Cost of raising and feeding a child (CNPP).

Research Into Children's Nutrient Requirements

- Nutrient requirements of children and pregnant and lactating women (ARS).
- Energy requirements of children (CSREES).

Better Nutrition Understanding by Parents and Children

- WIC and NET nutrition education programs (FCS).

Effective Monitoring of Childhood Nutrition

Informed Federal, State, and Local Nutrition Policies

Improved Food Availability

Improved Food Choices by Parents and Children

Healthier Children

every 5 years to reflect new scientific knowledge. The guidelines include such advice as choose a diet low in fat, and choose a diet with plenty of vegetables, fruits, and grain products.

The Dietary Guidelines Advisory Committee (a blue-ribbon panel of nutrition experts, appointed jointly by USDA and the Department of Health and Human Services) completed its deliberations on the guidelines and the 1995 revision was released in December (see pp. 19–20). These guidelines are at the hub of many of USDA's nutrition research and education activities.

USDA sponsors many studies of what nutrients and how much people need and how these needs vary depending on such factors as pregnancy, age, gender, and ethnicity. One example is a study of energy requirements in children, and how the requirements are affected by body composition, gender, physical activity, ethnicity, and diet (see p. 25). In light of the rapid rise in the incidence of childhood obesity (see p. 30), it is urgent that we better understand children's energy requirements. This information is also important to USDA in specifying calorie levels for its meal programs for schools and child care centers.

USDA also assesses and monitors the diet eaten by the U.S. population (see p. 16). The data gathered offer feedback on the progress made in meeting the Dietary Guidelines. Finding out what children eat, how much, and the nutrient content of these foods is not an easy task. Gathering information on the food intake of preschool children is further complicated by the fact that most of the information comes from parents and child care workers who are in charge of more than one child.

USDA's National Nutrient Database for Child Nutrition Programs (see p. 16) stores information on the nutrient content of food used in school meals. Maintaining nutrient databanks is an exacting and a continuous process. Not only is the quality of the data improved with better methods of food analysis, but our food supply changes constantly. As examples, new products are developed (new breakfast cereals, fat-free sour cream), cattle and pigs are bred to provide leaner beef and pork, and new varieties of plant foods are imported or developed through crossbreeding and biotechnology.

USDA's research and dietary surveys provide valuable information about children's nutrient requirements, the nutritional adequacy of their diet, and where to direct the focus of nutrition education. The cornerstone of nutrition education programs for children is the Food Guide Pyramid (see pp. 29, 35), developed by USDA. It is a visually appealing and instructive representation of what constitutes a good diet, and is used extensively in nutrition education.

Federal food assistance programs make a significant contribution to high-quality diets for children and their families by providing supplemental foods and nutrition education.

Figure 3 illustrates how USDA research, monitoring, and education converge to promote high-quality diets for children. The list below includes some additional activities.

- The 1994–95 diet survey improved nutrient intake data for infants and children by surveying more children and expanding the food-coding database for more detail on foods and drinks consumed (see p. 16).

- The Safe Food-Healthy Children Program reached about 300 child care providers with information about safe food-handling practices (see p. 29).

- The Pesticide Data Program broadened to include more foods consumed in quantity by infants and children (see p. 13), in response to the National Academy of Sciences report, "Pesticides in the Diets of Infants and Children."

- A study showed that iron intake in preschoolers is associated with socioeconomic factors and is improved by participation in food assistance and nutrition education programs (see p. 31). Iron-deficiency anemia is a common problem in malnourished preschoolers.

- Home day care providers reduced the amount of fat in their children's menus after taking part in the Heart-Healthy Menus for Kids program in Kansas (see p. 29).

- In California educational materials were produced for parents of children at high risk of obesity. Related in-service training was provided to over 10,000 health professionals. Elsewhere across the country, materials and methods were disseminated to other professionals (see p. 30).

- Community nutrition education cooperative agreements funded 10 community-based consortia to develop, conduct, and evaluate nutrition education projects (see p. 42).

- Food Stamp Program matching grants in 25 states provide nutrition education for program participants (see p. 41).

- Padres Hispanos en Accion is a partnership between NET (the National Education and Training Program) and Head Start centers to deliver nutrition training to parents (see p. 38).

So the food supply is safe as well as nutritious, USDA research and education also promote food safety. Figure 4 shows how these food safety activities interact to help ensure healthy families.

Figure 4. How USDA research and education programs help ensure food safety

Developing Educational Programs on Food Safety

- National Food Safety and Quality Initiative (CSREES) develops programs at land-grant universities.

Gathering Information on Educational Materials for Food Safety

- USDA/FDA Foodborne Illness Education Information Center (NAL) reaches thousands of educators and health professionals.

Teaching Food Service Personnel About Food Safety

- National Food Service Management Institute (FCS).

Teaching Families About Food Safety

- Safe handling instructions on raw meat and poultry (FSIS).
- Meat and Poultry Hotline (FSIS).
- Expanded Food and Nutrition Education Program (CSREES).

Teaching Children About Food Safety

- Expanded Food and Nutrition Education Program (CSREES).
- Pilot program for children in Kentucky (CSREES).

Gathering Information on Training Materials for Safer Food Processing Methods

- Hazard Analysis and Critical Control Point database for trainers (p. 44, NAL).

Understanding the Economics of Food Safety

- Studies of costs and benefits (ERS, FSIS).

Research on Food Safety

(CSREES).

Improved Food Handling Practices

Safer Food in the Home

Improved Safety of the Food Supply

Changes In Food Safety Policies and Regulations

Fewer Cases of Foodborne Illness

Safer Foods in Institutions and Restaurants

Healthier People

Children are particularly susceptible to foodborne illness, and the consequences for them are usually much more severe than they are for adults. It is crucial for children's health that the food supply be safe, and that children and their parents and other caregivers understand how to safely handle and prepare food. Some USDA programs which help ensure that children consume safe food are listed following:

- Education programs such as the Expanded Food and Nutrition Education Program (EFNEP) (see p. 23). EFNEP reaches over 400,000 low-income youth and almost 200,000 families.

- Demonstration projects, such as "Teaching Food Safety to Young Children" in Kentucky, which has reached over 500 children ages 3–9 years (see p. 30).

- Food safety programs at land-grant universities developed through the National Food Safety and Quality Initiative (see pp. 22–23).

- Public information disseminated through safe-handling instructions on meat and poultry labels and the Meat and Poultry Hotline (see pp. 42–43).

- Information and educational materials for professionals about food safety, including efforts of the USDA/FDA Foodborne Illness Education Information Center, which has contacted thousands of professionals via outreach activities (see p. 43).

- Research on food contaminants, such as the study by the Western Regional Research Project of toxicants and antioxidants (see p. 26).

- Studies of the costs and benefits of food safety (see pp. 34–35).

School Nutrition Programs

USDA administers several meal programs to meet the needs of children (fig. 5). The National School Lunch Program helps provide lunches to about 25 million school children, and the School Breakfast Program (see p. 35) helps provide breakfasts to almost 6 million children, mostly from low-income families. For preschool children, there is the Child and Adult Care Food Program (see p. 35), which helps offer meals to nearly 2 million children in day care centers and homes. This program also helps provide meals for disabled and elderly adults in nonresidential care centers. As with the School Lunch Program, USDA provides funds and donated foods (USDA commodities).

USDA-supported meal programs also provide a good example. In New Jersey, children in some of the private day care centers were less likely to eat a good breakfast than those in Head Start centers that participate in the School Breakfast Program. With the support of the New Jersey Department of Education, the private centers initiated their own breakfast program that met the nutritional guidelines of the School Breakfast Program (see pp. 28–29).

When the School Lunch Program began in 1946, children didn't rely as much on school meals to provide the bulk of their dietary needs. At that time the nation's primary nutrition problems were dietary deficiency diseases. These deficiencies were addressed through a requirement that a school lunch include set amounts of food from the meat, milk, bread, and fruit/vegetable groups. Now, as reflected in the Dietary Guidelines, our major nutrition problems are those which contribute to overweight and such chronic diseases as heart disease and cancer (the nation's first and second leading causes of death among adults). In other words, we now need to be concerned with the long-term choice of traditional food groups, as well as food within the groups (for example, foods with less fat and salt).

The recently begun School Meals Initiative for Healthy Children formalizes the need for dietary changes by requiring that school meals comply with the Dietary Guidelines (see p. 37). This initiative is the most comprehensive and integrated reform of school meals since the program began 50 years ago. It includes activities that assist 90,000 schools in providing healthier meals and in teaching good nutrition, and it calls for improving the nutritional value of USDA commodities while maintaining USDA's support for domestic agriculture.

To help implement the initiative, USDA launched Team Nutrition (see p. 35), "a network of public-private partnerships that brings to life the promise of children's health." Team Nutrition projects are far-reaching and varied. They include, for example, grants to train school food-service professionals; a partnership with the Disney Company to use the characters Timon and Pumbaa from "The Lion King" as "spokestoons" to promote healthy eating to children; and the reduction of administrative burdens and paperwork in school meal programs.

A component of the child nutrition programs, the Nutrition Education and Training Program (NET) provides leadership, resources, training, and educational experiences that promote healthy eating habits for our nation's children in schools and day care centers. State NET coordinators help teachers learn the principles of nutrition and how to make these basics meaningful to their students. The coordinators also train food-service personnel and support stimulating learning experiences for children.

Figure 6 shows the large and varied roles that USDA plays in school nutrition by expanding on USDA's work on a school lunch favorite—cheese pizza. It's hard to get children to cut back on favorite foods like pizza, so the challenge was to make cheese pizza healthier and acceptable. USDA met that challenge.

Figure 5. How USDA provides better nutrition through schools

Healthier School Meals: Over 25 million children take part in the National School Lunch Program, and almost 5 million in the School Breakfast Program (FCS).

- Diet survey showing that children don't eat enough fruits and vegetables (ARS).
- School Meals Initiative for Healthy Children says school meals must comply with Dietary Guidelines (FCS), for example, eat a diet with lots of fruit and vegetables and less fat.
- Purchase program modified to permit more fresh produce and lower fat ground beef for school meals (AMS).
- Experts evaluate use of soy protein for children to help reassess current regulation on vegetable protein products for school meals (CNPP).
- Evaluation of the nutritional content of school meals (FCS).

Team Nutrition
USDA's public-private partnership of over 200 nutrition, health, education, and food industry groups (FCS).

- Scholastic, Inc., develops nutrition education materials to reach 92,000 schools via direct sales, corporate support, Internet, and satellite uplink.
- National PTA distributes education material for parents to help children choose a heathful diet.
- Chefs help develop tasty low-fat recipes, distributed to 23,000 school districts.
- The Fresh Produce Marketing Association helps develop training for school food-service personnel on procuring, storing, and using fresh produce.

Technical Support and Training for School Food-Service Personnel

- Healthy School Meals Resource System to make resources electronically accessible to school service personnel (NAL).
- National Nutrient Database for Child Nutrition programs (of USDA commodities and quantity recipes supplied to schools) to assess nutritional adequacy of meals (ARS).
- Nutrient-analysis software evaluated and improved for use in school meal programs (NAL, FCS).
- Nutrition Education and Training Program supports state efforts to train food-service personnel (FCS).

Better Nutrition and Better Learning for School Children

Nutrition Education in Schools, in the classroom and after-school care programs (CSREES, FCS).

Additional activities related to school nutrition are listed below:

- The Second National NET Conference was held and included all 53 state coordinators, educational materials developers, and other Federal and state cooperators (see p. 38).
- An expert panel met to evaluate the role of soy protein in children's diet (see p. 22) in order to help the Department reassess its current regulation on vegetable protein products for school meals.
- Specifications were developed for nutrient analysis software to be used by schools for compliance with requirements of the School Meals Initiative for Healthy Children. Industry-submitted software was evaluated and improved (see p. 43).
- A purchasing program for school meals was modified to allow more choice in planning a healthy menu—more fresh fruits and vegetables, lower fat in commodity ground beef, less sodium in commodity processed meat (see next column).
- The Healthy School Meals Resource System provides school food-service personnel with electronic access to information related to the School Meals Initiative and Team Nutrition (see p. 43).

Summaries of Agency Activities

Agricultural Marketing Service

The mission of the Agricultural Marketing Service (AMS) is to facilitate the strategic marketing of agricultural products in domestic and international markets, while ensuring fair trading practices and promoting a competitive and efficient marketplace. The role of AMS in USDA's human nutrition research and education is related to the food supply, particularly the availability and accessibility of food. AMS helps ensure that consumers continue to have available a wholesome, high-quality, abundant, reasonably priced food supply.

"How To Buy . . ." Revision Completed
Six revised brochures from the AMS "How To Buy . . ." series were reprinted and distributed, including the brochures about meat, poultry, eggs, dairy products, cheese, and butter. Revised brochures covering fruits and vegetables were distributed earlier. Dietary guidance information was included in the brochures for the first time. The series originated in 1967 as part of a campaign to inform consumers about USDA's food grades and grading services. It had been unavailable for distribution since the early 1980's, although the agency continued to receive requests for it. Contact: Connie Crunkleton (202) 720–8998.

Nutrition Facts Panel Required on Commodities
AMS began requiring processors to apply the Nutrition Facts Panel to commodities purchased for the Department's food distribution programs. While the commodities were originally exempt from labeling requirements of USDA and the Food and Drug Administration, the Food and Consumer Service (FCS) requested the labeling to help recipients analyze their recipes and menus. In the past, FCS provided nutrition information about commodity foods in loose-leaf fact sheets. Contacts: fruits and vegetables, Darrell Breed (202) 690–1300; poultry, Susan Trudell (202) 720–7693; meat, Barbara Cope (202) 720–2650.

Fresh Produce for Schools
AMS modified its purchase program for fresh fruits and vegetables. Delivery schedules were tightened, allowing states to distribute the highly perishable commodities to schools more efficiently. Purchases of value-added products, such as carrot sticks, were completed with mixed results. AMS purchased 38.4 million pounds of fresh fruits and vegetables for the 1994–95 school year at a cost of $9.6 million. The purchases included apples, carrots, grapefruit, oranges, pears, tomatoes, and russet potatoes. AMS will continue to work with FCS on ways to improve product offerings and delivery. Contact: Darrell Breed (202) 690–1300.

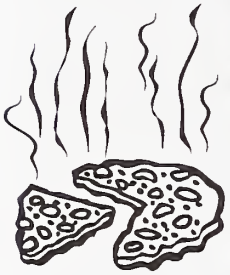
Marketing Local Produce to Schools
AMS and FCS sponsored a meeting in Atlanta to explore ways to get locally produced food into the school lunch programs. The meeting assembled about 50 school lunch procurement officials and limited-resource farmers from the surrounding seven states. General agreement was reached to consider some commodity trials in specific school programs. Contact: Harold Ricker (202) 720–2704.

Turkey Ham Tested in Schools
AMS purchased smoked turkey ham in a test program during the 1994–95 school year. The turkey ham is fully cooked and 95 percent fat-free, providing a nutritious, desirable, low-labor item. Initial comments from schools were very positive, and the turkey ham program was expanded for the 1995–96 school year. Contact: Susan Trudell (202) 720–7693.

More Nutritional Improvements in Donated Ground Beef
AMS specifications for commodity ground beef continued to be revised to reduce fat wherever practical and feasible. For the 1993–94 school year, the fat content was lowered 1 percent, from a maximum of 19 percent to 18 percent on the raw product. In actuality, most of the ground beef averaged less than 18 percent fat. During the 1994–95 school year, laboratory results showed that the average fat content of

Figure 6. From lab bench to school lunch, a lower fat mozzarella cheese

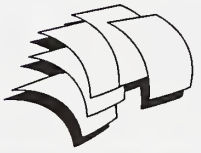
Choose a Diet Low in Fat is one of the Dietary Guidelines for Americans put out by USDA and the Department of Health and Human Services.



The Pizza Connection: Dairy products are important sources of calcium and other nutrients. Pizza is a school lunch favorite, but cheese makes it high in fat. Low-fat cheeses don't melt well and don't taste as good.

Congressional Mandate for Dietary Guidelines

Scientists Develop a Lower Fat Cheese at the Eastern Regional Research Center of the Agricultural Research Service. Regular and part-skim mozzarella cheese on the market are 17–24% fat. This one has only 9–11% fat, with good taste, texture, and melting qualities.



Scientific Journals & Meetings: Research made available to dairy scientists and industry

Technology Transfer

Cheese Manufacturers offered assistance by USDA scientists through ARS's Office of Technology Transfer.

The Taste Test: USDA's Food and Consumer Service tries pizza topped with this cheese on groups of children nationwide—a success!

Potential Market Impact
Expect to see this cheese used by pizza companies. Americans eat a lot of mozzarella cheese —mostly on pizza.

Bids For Purchase:
USDA's Agricultural Marketing Service develops specifications for purchase of the new cheese.

Cheese Manufacturers Respond: USDA's Farm Service Agency receives bids and over 1.5 million pounds of this new cheese are purchased to use on pizza served in school lunches. The Agricultural Marketing Service monitors cheese quality.

A Better Diet for School Children
Less fat in pizza without cutting the needed nutrients—or acceptability. Over 25 million children take part in the National School Lunch Program, administered by USDA's Food and Consumer Service.

raw, bulk ground beef was 16.8 percent. Contact: Barbara Cope (202) 720–2650.

Beef Patties Offered to Schools
AMS offered precooked ground beef patties (beef and seasonings only) and precooked beef patties (ground beef, vegetable protein product, and seasonings) to schools in the winter of 1995, under the State Option Contract Program. The program, utilizing reprocessing contracts, converts raw commodities into finished products to the economic advantage of participating schools. Contact: (Barbara Cope (202) 720–2650.

Fresh Ham Added to School Lunches
AMS designed a program for purchasing fresh hams, a new, highly desirable product, for schools participating in the National School Lunch Program, while providing price support for the domestic pork industry. The program was implemented in the spring of 1995. Based on industry data, the roasts average about 6.25 percent fat. Contact: Barbara Cope (202) 720–2650.

Sodium in Meat Commodities Reduced
In keeping with the trend to continually improve commodities, AMS began discussions with industry about reducing the sodium level in commodity ham (fully cooked, boneless, frozen). Possible alternative curing agents will be researched before any final changes are made. Specifications were revised to reflect the lower sodium content of canned beef, canned pork, and canned luncheon meat. Contact: Barbara Cope (202) 720-2650.

School Lunch Specs Set for Lite Cheese
In response to a request from FCS, AMS developed specifications for lite mozzarella cheese for the school lunch program. The Agricultural Research Service (ARS) developed a manufacturing procedure for low-fat mozzarella cheese that was different from commercial practice. The new AMS specifications permit companies to use the ARS procedure or their own manufacturing procedures. Composition standards require mozzarella cheese to contain a minimum of 21.6 percent milkfat and part-skim mozzarella to contain a minimum of 16.5 percent milkfat. The specifications for lite mozzarella provide for 10.8 percent maximum milkfat. Contact: Duane Spomer (202) 720–7473.

Pesticide Residues Tracked
The Pesticide Data Program develops and disseminates information on pesticide residues in the nation's food supply and improves government dietary risk-assessment procedures. The program relies on residue data collected through cooperative agreements with nine participating states and three USDA cooperating laboratories. The data are provided to the Environmental Protection Agency (EPA) for use in special review and reregistration of pesticides and to other government agencies and organizations for use in safeguarding public health.

In 1994, AMS collected and analyzed 7,589 samples, performed about 51,000 analyses, and reported 75 different residues. As of July 1995, there were methods for 46 pesticides of priority to EPA in the program, including 5 multiresidue methods and 5 specific residue test methods. In 1994, an electronic information system was installed in participating laboratories to improve data communication and speed information processing.

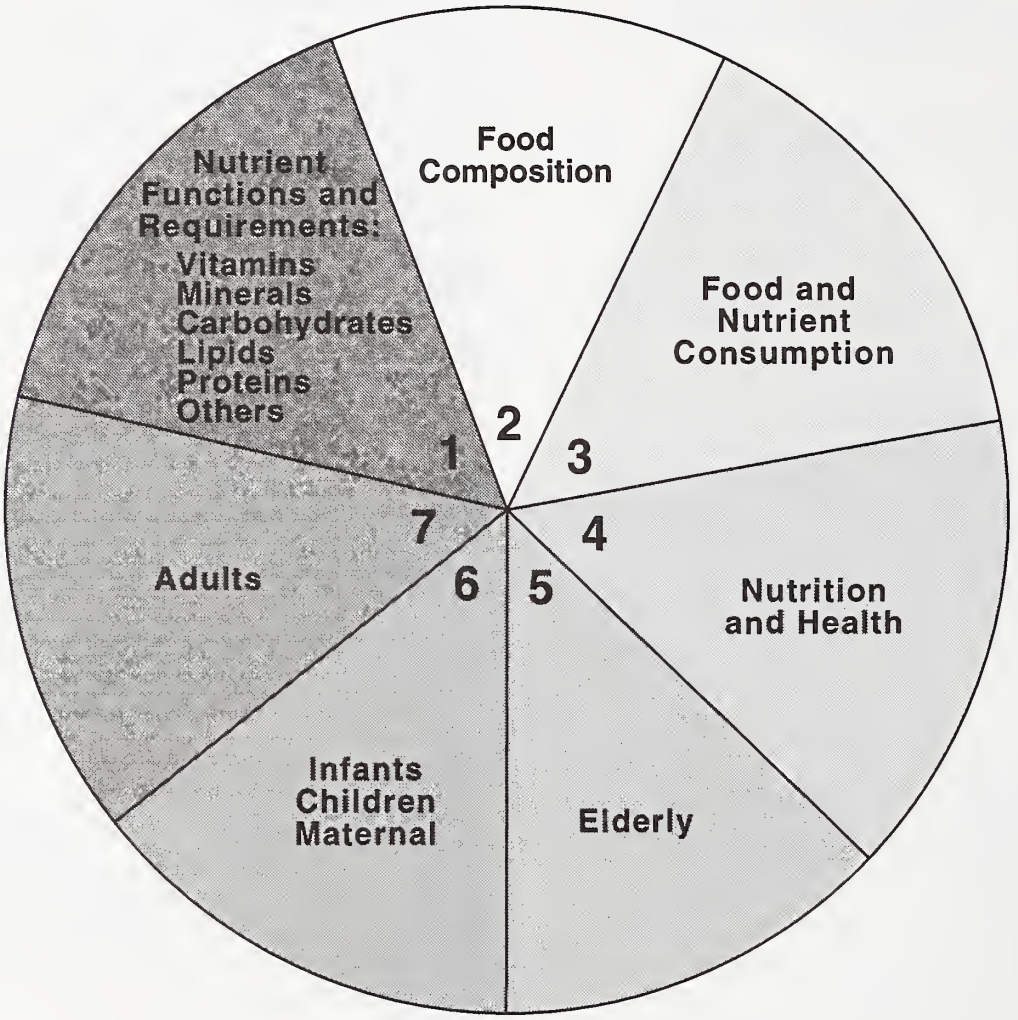
In response to the National Academy of Sciences report, "Pesticides in the Diets of Infants and Children," the program added processed products, grain, and dairy commodities to its future work. Canned and frozen sweet corn and peas were added in April 1994, and a national wheat survey began in January 1995. In 1995, a total of 8,000 samples was collected, with over 50,000 analyses scheduled. Sampling included 12 commodities, 11 of which are highly consumed by infants and children. Contact: William Franks (202) 720–5231.

National Organic Standards Program
The National Organic Standards Board developed recommendations for most national standards for organic products, as well as a certification program for organic products produced in accordance with the Organic Foods Production Act of 1990. The board includes farmers, consumers, environmentalists, handlers, a retailer, and a scientist. It operates with AMS oversight. Based on these recommendations, USDA developed proposed rules, which were made available for public comment. Final rules are targeted for the fall of 1997, with program implementation soon thereafter. Contact: Harold Ricker (202) 720–3252.

Farmers' Market Directory Published
A national directory of farmers' markets was published cooperatively by state departments of agriculture and AMS. The new report, *1994 National Farmers' Market Directory*, includes a contact, telephone number, address, and descriptive category for each market. The directory lists are sorted by state and city and will be updated annually. Contact: Arthur Burns (202) 720–8317.

Urban Markets Meeting To Be Held
A National Urban Markets and Community Development Conference, sponsored in part by AMS, brought together planners, financial leaders, community leaders, nutrition experts, and others to share techniques, concepts, plans, and evaluations of research proposals. Urban markets bring fresh produce and other farm products to inner city residents. These markets can also serve as nutritional outreach centers for local residents. The meeting offered an opportunity to develop new concepts and improve techniques for developing and operating this type of market. Projects to develop urban market development projects are under way in Philadelphia, Asheville, NC, and Columbus, OH. Contact: Arthur Burns (202) 720–8317.

Figure 7. Research areas of the five ARS human nutrition centers



Human Nutrition Research Centers

Beltsville Human Nutrition Research Center
1, 2, 3, 4, 5, 7

Grand Forks Human Nutrition Research Center
1, 4, 7

Children's Nutrition Research Center, Houston
1, 4, 6

Human Nutrition Research Center on Aging, Boston
1, 2, 3, 4, 5, 7

Western Human Nutrition Research Center, San Francisco
1, 2, 3, 4, 6, 7

Lower Mississippi Delta
3, 4

Farmers' Markets Surveyed
A report, funded in part by AMS, was prepared that provides data collected from 1,700 farmers' markets throughout the United States. The report contains important characteristics of the different farmers' markets serving the public and local agricultural producers. Contact: Arthur Burns (202) 720–8317.

Profile of Farmers' Market Shoppers To Be Drawn
A profile of farmers' market users was developed through a state-wide study of Delaware consumers, in cooperation with AMS and the University of Delaware. The results help agricultural producers attract and retain consumers. The data were compared with similar information collected in 1981 to help identify changing selections of products accompanying population changes in the state.

Another study, conducted in cooperation with the Kentucky Department of Agriculture, provides information that helps local farmers' markets broaden their customer base to include regional tourist traffic. Contact: Arthur Burns (202) 720–8317.

Developing New Rural Markets
A study conducted by the South Carolina Department of Agriculture in cooperation with AMS will help develop special retail outlets for minority farmers in the Sea Islands. The new markets will provide additional sources of income for farmers and new sources of fresh produce and other agricultural products for visitors. Contact: Arthur Burns (202) 720–8317.

Special studies are under way in Madison, WI, and the mid-Hudson Valley region of New York to develop new retail farmers' markets. The studies are part of an ongoing program, partially funded by AMS, to develop marketing outlets for small- to medium-sized agricultural producers. Contact: Arthur Burns (202) 7290–8317.

Modernizing Produce Markets
Projects in progress in Thomasville, GA, Syracuse and the mid-Hudson Valley, NY, and St. Louis, MO, in cooperation with AMS, will help improve the accessibility of fresh produce to consumers by reducing marketing costs and improving efficiency. Previous studies documented the importance of these markets as outlets for agricultural producers and as sources of fresh produce for urban food retailers and consumers. Contact: Arthur Burns (202) 720–8317.

Agricultural Research Service

Human Nutrition Research
Human nutrition research is conducted at five major centers and in several other ARS locations. Figure 7 shows the research areas of each center.

- Beltsville Human Nutrition Research Center, Beltsville, MD, is examining nutrition-gene relationships to form recommendations for individuals' and groups' nutrient needs. The center is responsible for leadership in food composition methodology and maintains the National Nutrient Data Bank. Food consumption monitoring is conducted to determine national patterns and the needs of special groups. Contact: Joseph Spence (301)–504-8157.

- Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, is concerned with identifying the nutrient needs of the aging and limiting the risk of cardiovascular diseases, cancer, osteoporosis, immune function disorders, cataract formation, and loss of cognitive and physical function. Contact: Irwin Rosenberg (617) 556–3330.

- Grand Forks Human Nutrition Research Center, Grand Forks, ND, continues pioneering research on the human requirements for minerals and ultratrace elements to maintain health and prevent disease and is a leader in the development of systems analysis of nutrient requirements. Contact: Forrest Nielsen (701) 795–8456.

- Children's Nutrition Research Center, Baylor College of Medicine, Houston, is establishing the nutrient requirements to prevent low-birth-weight babies, particularly in pregnant adolescents. It is also establishing the nutrient needs of children as they develop in order to sustain a healthful life. Contact: Dennis Bier (713) 798–7022.

- Western Human Nutrition Research Center, San Francisco, is establishing markers of nutritional status and the relationship of dietary intake, physical exercise, and genetics in healthy weight. Contact: Janet King (415) 556–9697.

Other research locations include the Arkansas Children's Hospital and Research Institute, in Little Rock, where research is conducted on the effects of diet on the cognitive and behavioral development of children. Research on the nutritional qualities of plants and animals is conducted at ARS regional research laboratories in Peoria, IL; Ithaca, NY; and Albany, CA. Contact Jacqueline Dupont (301) 504–6216.

During FY 95, results of about 300 research projects were published in scientific journals. ARS human nutrition scientists wrote many reviews and participated in numerous conferences and workshops to evaluate and disseminate knowledge of nutrient requirements and functions, food composition, and food consumption of Americans. Of the reports of nutrient functions and requirements, about 23 percent concerned fundamental aspects of normal nutrient functions. Of the nutrient function and requirements reports related to specific population groups, 15 percent concerned infants and children; 5 percent, maternal nutrition; 3

percent, adults; and 9 percent the elderly. Nutrition research more closely related to disease prevention constituted 42 percent of the reports, and food composition made up 8 percent. About 11 percent of the total comprised applied nutrition reports, related to food consumption survey research, databases for nutrients and other food components, and epidemiology.

New Nutrition Programs Started

In 1995, a nutrition program to be administered by ARS was established at the Arkansas Children's Hospital and Research Institute. ARS was also asked to establish a nutrition intervention research program in the Lower Mississippi Delta region of Arkansas, Louisiana, and Mississippi (103rd Congress, 2nd Session, Senate Report 103–290). Researchers assess the nutritional status of delta residents and then design and test nutrition intervention strategies. Partners with ARS are Alcorn State University, Arkansas Children's Hospital and Research Institute, Pennington Biomedical Research Center, Southern University and A&M College, University of Arkansas at Pine Bluff, and University of Southern Mississippi. Contact: Frankie N. Schwenk (301) 504–9158.

Gathering and Disseminating Food Composition Data

The demand for valid food composition data and product information by the food and health care industries, nutrition researchers, and government has intensified in recent years. The advent of food labeling on retail products has increased the need for accurate data.

ARS's Nutrient Data Laboratory (NDL) collects, reviews, and validates data for the National Nutrient Database for Child Nutrition Programs. Schools use these data to determine the nutrient content of recipes and menus that meet the nutrition standards for the national school lunch and breakfast programs. The database contains nutrient data on 131 commodities and about 300 brand name processed foods. It is available free of charge and is posted on NDL's electronic bulletin board.

NDL is working with the International Food Distributors Association (IFDA) to provide nutrient data on brand names. In 1991, IFDA, which is responsible for the distribution of nearly 80 percent of the food sold wholesale, developed a format for electronically exchanging data in a standardized manner. In cooperation with IFDA, NDL developed three records for addition to the latest version (1995), which seeks quality control information on sampling, sample handling, methods, procedures, use of reference materials, and laboratory information. The IFDA standard will facilitate the electronic exchange of food-related data among educational, monitoring, research, and marketing programs. A 5-year plan for a clearinghouse for food product information is proposed. Contact: Joanne Holden (301) 734–8491.

Nationwide Food Surveys

The nationwide food surveys conducted by ARS address the requirements of the National Nutrition Monitoring and Related Research Act of 1990 for continuous monitoring of the dietary status of the U.S. population. These surveys include the Continuing Survey of Food Intakes by Individuals (CSFII) and the Diet and Health Knowledge Survey (DHKS). Progress made on the surveys in 1995 is described below.

Survey operations. Collection of the 1994 CSFII and DHKS data was completed in early 1995. One-day intakes were provided by 5,589 individuals, 2-day intakes by 5,311 individuals, and DHKS data by 1,850 individuals. Response rates were 80 percent for the 1-day data, 76 percent for the 2-day data, and 71 percent for the DHKS data.

Survey Net is a computerized system for on-line coding and editing of food intake data, which was fully implemented with the beginning of the CSFII 1994–96. This system permits continuous monitoring of the quality of survey data as they are collected. The food coding database has expanded from 5,660 food codes in 1989 to about 7,200 codes. Codes were added to accommodate the increase of foods modified to be lower in fat, calories, sodium, and other nutrients and to identify the original processed form of vegetables before they were incorporated into recipes.

Data release. The 1994 CSFII and DHKS data were released at the end of 1995. This release about 10 months following completion of data collection was much faster than those from previous surveys.

The 1989–91 CSFII–DHKS data were newly released on CD–ROM and the 1994 data were also released on CD–ROM shortly after the magnetic tape was made available.

Two major statistical reports from the 1989–91 survey were completed. One provides 1-day food and nutrient intake data and the other provides information from the Diet and Health Knowledge Survey. A series of fact sheets and a bibliography are posted on the Internet. Contact: Alanna Moshfegh (301) 734–8457.

Changes in CSFII–DHKS

The CSFII–DHKS 1994–96 differs from the 1989–91 surveys in several important ways: (1) inclusion of a target population of noninstitutional individuals in all 50 states rather than the 48 conterminous states; (2) the collection of 2 nonconsecutive days of food intake through in-person interviews, rather than 3 consecutive days of food intake using a 1-day recall and a 2-day record; (3) oversampling of the low-income population, rather than a separate low-income survey; (4) a larger sample in selected sex-age categories, specifically young children and the elderly; and (5) subsampling within households, rather than the collection of information from all members of a household. Contact: Alanna Moshfegh (301) 734–8457.

Dietary Protein in Breast-Fed Infants
Questions have been raised about growth differences in breast-fed infants compared with formula-fed infants. Scientists at the Children's Nutrition Research Center, Houston, hypothesized that changes in the growth patterns of breast-fed infants are like those of formula-fed infants because breast-fed infants use the nutrients in human milk more efficiently. Researchers measured changes in 10 breast-fed and 10 formula-fed newborns at 6-week intervals during the first 24 weeks of life. They found length and weight gains, lean body mass, and body fat accretion were similar in the two groups, despite much lower protein and energy intakes by the breast-fed group. Also, the breast-fed infants were nearly twice as efficient in using dietary protein for lean body mass. This finding illustrates the tremendous biologic adaptability of human infants, who are equipped with mechanisms that promote normal growth during exclusive breast-feeding despite their lower dietary intakes than formula-fed infants.

Iron Absorption
Scientists at the Children's Nutrition Research Center wanted to find out whether an iron supplement would be better absorbed by 1-year-old children when taken with juice or cow's milk. Children need to get enough iron after they're weaned onto cow's milk, which is low in iron. Researchers used a special, safe, stable isotope technique in a test with apple juice and milk involving 10 children who were recently weaned from formula to cow's milk. Iron absorption was much better when the supplement was given with juice than with milk—probably because ascorbic acid in juice enhances iron absorption, while the calcium in milk inhibits it. The stable isotope technique can be used in other iron supplementation studies.

In another study at the Children's Nutrition Research Center, incorporation of iron into the red blood cells was measured in 10 children (5 boys and 5 girls, age about 13 months) who had recently switched from formula or breast milk to whole cow's milk. A stable isotope of iron was given with a meal that included whole cow's milk. Absorption was compared to absorption of another stable isotope of iron, given 2 to 3 hours later with ascorbic acid to the same infants. Iron incorporation into the red blood cells was determined based on the enrichment of labeled iron in red blood cells collected 14 days after the isotopes were administered. Iron absorption averaged 5.7 percent with the milk and 13.7 percent with the ascorbic acid, indicating that iron was better absorbed when fed separately from milk.

Premature Infants Unable To Synthesize Some Amino Acids
Scientists at the Children's Nutrition Research Center studied a group of premature, intravenously fed, low-birthweight babies to evaluate their ability to synthesize seven amino acids from glucose. They used an intravenous, glucose, stable isotope tracer. The results suggest that such babies are not able to readily synthesize from glucose the amino acid cysteine (which is considered possibly essential) and the amino acid proline (which is considered nonessential to date). Researchers concluded that both cysteine and proline are essential amino acids for such babies, and amino acid mixtures given to them may need to be adjusted to account for this. These findings corroborate those of an initial study that used a glucose, stable isotope tracer given by stomach tube.

Higher Protein Needs During Rapid Growth in Infants
The proportions of muscle and bone, fat and water in infants recovering from failure to thrive are likely to reflect the composition of their diet, according to a study at the Children's Nutrition Research Center. Researchers studied 5 infants (9–17 months of age) with failure to thrive who were randomly assigned to receive a high-protein diet (HP, 4.0 g/kg) or a normal-protein diet (NP, 2.5 g/kg) during nutritional rehabilitation. Energy intakes were constant at 170 kcal/kg/day. The diet was administered continuously by nasogastric tube for 4 weeks. Weight, nitrogen balance, lean body mass, and serum prealbumin levels were determined at 1 and 4 weeks after nutritional therapy was instituted.

Nitrogen balance and serum prealbumin were higher on a HP diet, while lean body mass was similar between both groups, regardless of dietary protein intake. The data suggest the extra protein was used for developing organs.

Fruit and Vegetable Intakes of Children and Adolescents
Three days of dietary data from respondents in the 1989–91 CSFII were examined. The mean number of servings of fruits and vegetables consumed per day and the percentage of persons meeting various standards of intake were determined for 3,148 children and adolescents aged 2–18 years. Nearly a quarter of all vegetables consumed by children and adolescents were french fries. Their intakes of all fruits and of dark green and deep yellow vegetables were very low compared with recommendations. Only one in five children consumed the recommended average of five or more servings of fruits and vegetables per day.

Discovery of Diet-Induced Lactose Intolerance
Lactose intolerance, a condition involving problems digesting milk sugar, is often addressed by avoiding milk, a calcium-rich product crucial for growing children. Scientists at the Children's Nutrition Research Center determined that malnourished children are less able to digest lactose because the expression of the lactose gene in the intestine is suppressed in proportion to the extent of the malnutrition. This discovery is a step forward in nutrition research aimed at resolving a common problem currently afflicting countless Americans and others worldwide.

Discovery Could Lead to High-Calcium Snap Beans
Americans, particularly teenage girls, are consuming fewer dairy products, the main source of dietary calcium. Since

this trend can lead to osteoporosis in later life, other good sources of calcium must be found. Researchers at the Children's Nutrition Research Center found certain types of snap bean that are high in calcium and discovered that the amount of calcium in the pod depends on how an individual plant routes its calcium. In doing so, the investigators identified the specific anatomical traits that control the distribution of calcium in high-calcium snap beans. This research will be used to breed new types of high-calcium snap beans, enabling U.S. farmers to provide foods of greater nutritional quality.

Oatrim Found To Reduce Diabetes, Heart Disease Risks
Oatrim, a soluble oat extract high in soluble beta glucans, was consumed by men and women in long-term and short-term studies at the Beltsville Human Nutrition Research Center. In the long-term study, urinary malondialdehyde—a measure of lipid peroxidation, which is related to cardiovascular diseases—was reduced 80 percent. In the short-term study, glucose and insulin responses after consumption of instant, boiled, or baked foods containing Oatrim were lower than they were after a standard glucose tolerance test containing an equal amount of carbohydrate. Consumption of instant pudding resulted in high production of breath hydrogen and methane, indicating lower digestibility, so use of Oatrim in cooked foods may be more acceptable. These results show that Oatrim can be used to lower risk factors associated with diabetes and heart disease.

Deficiency in Host Alters Virus
The genetic material of certain viruses changes rapidly, making it difficult to develop effective vaccines against them. In a mouse model of a virally induced disease of the human heart muscle, scientists at the Beltsville Human Nutrition Research Center and the University of North Carolina showed that a virus changed its genetic constitution if allowed to grow in animals deficient in either of two nutritional antioxidants, vitamin E or selenium. Such shifts in genetic structure often result in viruses capable of causing more severe disease. If applicable to other viruses, these findings could revolutionize the role of nutrition in the therapy or prevention of a wide variety of human diseases.

Trans Fatty Acid Content of 200 Foods Made Available
Due to continuing interest in the health effects of trans fatty acids, scientists at the Beltsville Human Nutrition Research Center compiled recent data on the fat and fatty acid content of 214 food items. Many of the food items were selected for analysis because they are significant contributors of trans fatty acids in the food supply. The data, posted on the National Nutrient Data Bank bulletin board, will help health professionals assess the dietary intake of trans fatty acids.

1994 Dietary Survey Data Released
Data from the 1994 Continuing Survey of Food Intakes by Individuals and the 1994 Diet and Health Knowledge Survey were released to the public at the end of 1995. The data are available on magnetic data tape and CD–ROM. The 1-day intake participant response rate was 80 percent, considerably higher than in past nationwide surveys. Results indicate that intakes of fat were 33 percent of calories, higher than the 30 percent recommendation of the Dietary Guidelines for Americans but lower than values from the surveys conducted in 1977–78 (40 percent) and 1989–91 (34 percent). The information obtained from dietary surveys is used to advise action agencies about food assistance, food safety, food fortification and enrichment, and education programs.

Vegetable Mixture Improves Immune Response
Much of the U.S. population consumes fewer than the recommended five servings of fruits and vegetables a day. Scientists at the Beltsville Human Nutrition Research Center recently demonstrated that consumption of five servings per day of a certain mixture of vegetables—sweet potatoes, kale, and tomato juice—for 3 weeks caused a rise in blood carotenoid levels and increased immune cell (T lymphocytes) response. Increases in plasma carotenoid levels were detected within a day after the vegetable regime began and started to decline within a week after it stopped. Immune cell responsiveness increased by the end of 1 week on the regime and remained elevated through week 5 after vegetable consumption stopped. The findings indicate health benefits from increased consumption of carotenoid-containing vegetables.

Low-Copper Diets Weaken Immune Status
Copper deficiency impairs immune response in animal models and human infants, but the effects of low-copper diets on the immune status of healthy adults are not known. Research conducted at the Western Human Nutrition Research Center shows that several indexes of the immune response were significantly reduced in 11 healthy men whose copper intake was reduced to 0.38 mg/day for 42 days. Increasing the amount of copper intake to 2.5 mg/day for 24 days prevented further decreases in immune response but did not restore the subjects to the original level. These data suggest that adequate consumption of copper may be critical in maintaining a healthy immune system.

Test Forecasts the Speed of Body Fat Loss
Despite billions of dollars spent every year on dieting, few people reduce their body weight to a healthy level. Scientists at the Western Human Nutrition Research Center found that a lab measurement of free fatty acids in blood predicts which dieters are likely to be faster or slower at shedding fat. The test can be administered within a few days after the dieter starts a weight loss program and requires less than a teaspoon of blood, drawn after exercise but before breakfast. Dieters who know their prognosis will be better prepared for what's ahead, and nutritionists and physicians could use the test to set more realistic weight loss goals for their patients.

Low Levels of B_{12}, B_6, and Folate Elevate Risk for Arteriosclerosis in the Elderly
Researchers at the Human Nutrition Research Center on Aging showed that elevated levels of the amino acid homocysteine and low levels of folate and vitamins B_{12} and B_6 are associated with an increased risk of carotid artery arteriosclerosis in the elderly. Increasing the dietary intake of these vitamins involved in homocysteine metabolism, especially folate, could reduce the number of deaths annually from coronary artery disease.

Nutrition Affects Cognitive Function in Elderly Men
At the Human Nutrition Research Center on Aging, the performance of elderly men on tests of language, memory, speed, and spatial skills was associated in some cases with levels of several B vitamins and homocysteine. Subjects with lower vitamin B_{12} or folate levels or both were more likely to err on the tests. Men with higher homocysteine levels were particularly prone to error. Those with higher levels of vitamin B_6 recalled more than those with lower levels on two difficult memory tests. These studies in a relatively healthy sample of older men suggests that B vitamins and homocysteine are determinants of cognitive abilities in aging adults.

Increasing the Nutrients in Corn
Increasing the concentrations of bioavailable calcium, iron, and zinc would improve the nutritional value of corn grain. Scientists at the ARS Plant, Soil, and Nutrition Laboratory, in Ithaca, NY, found considerable genetic diversity in the mineral element content of corn kernels. Incorporation of the opaque–2 (high lysine) gene into certain inbred lines increased the concentrations of essential mineral elements. Similarly, corn grain from a cultivar containing the gene(s) for multiple rows of aleuron cells had higher concentrations of several important mineral elements, compared with commercial varieties containing a single row of aleuron cells.

Increases in mineral reserves of corn grain enhances the vigor of subsequent crops when grown in nutrient-poor soils. And, people who depend on corn grain as a staple would benefit from the increased quantities of calcium, iron, and zinc in their diets. Introduction of varieties containing higher levels of bioavailable micronutrients could reduce the incidence of nutritional deficiencies.

Iron and Zinc Absorption Reduced in Vegetarians
Iron and zinc nutrition may be of special concern to vegetarians for two reasons: (1) meats provide substantial amounts of these minerals in a highly available form, and (2) greater consumption of fiber and phytic acid from whole grains and legumes may reduce the absorption of iron and zinc. At the Grand Forks Human Nutrition Research Center, in North Dakota, researchers studied the effects of 8 weeks of a vegetarian diet that includes milk and eggs on iron and zinc absorption. Women on the diet absorbed less than one-third as much iron and three-quarters as much zinc as the amounts absorbed from a nonvegetarian diet. There was no difference between the two diets in blood indices of iron status, although plasma zinc was lower after consuming the vegetarian diet for 8 weeks. These findings confirm the need for the long-term nutritional monitoring of iron and zinc nutriture in persons following vegetarian diets.

Marginal Magnesium and Boron Deprivation Found To Affect Brain Function
Severe magnesium deficiency is frequently accompanied by excessive electrical activity in the brain, including seizure-like activity. Scientists at the Grand Forks Human Nutrition Research Center, in North Dakota, showed that postmenopausal women who ate about one-third the recommended dietary allowance for magnesium daily for 6 weeks exhibited increases in brain electrical activity very similar to those found with severe magnesium deficiency, although not so severe. Changes in brain electrical activity indicating decreased mental alertness were also found when the women ate less than 1 mg of boron daily, compared with when they ate more than 3 mg of boron daily. These findings are important to gaining a better understanding of the consequences of marginal and severe deficiencies of magnesium and boron in the diet and may have implications for treatment of clinical disorders, including those involving hyperactivity.

Diet Affects Milk Production in Adolescent Mothers
The number of breast-feeding adolescents is increasing, yet the Recommended Dietary Allowances (RDA) for lactation do not include teenagers' needs for growth. Scientists at the Children's Nutrition Research Center studied 11 adolescents who were breast-feeding their infants and 11 who were not at 6 weeks after birth. Dietary intakes were recorded for 3 consecutive days and nutrient intake was estimated using a nutrient database system. Milk production averaged 16 oz/day. Mean dietary energy, protein, and vitamins B_6, folate, and A were significantly higher in the breast-feeding mothers, but their milk production was 33 percent lower than the amounts produced by mature breast-feeding women. Low energy intakes contributed to low milk production in this group of adolescents.

Center for Nutrition Policy and Promotion

The mission of the Center for Nutrition Policy and Promotion is to improve the health of Americans by linking scientific research to the consumer. The center was established on December 1, 1994, as part of the USDA reorganization.

Dietary Guidelines for Americans
The center worked with ARS and the Department of Health and Human Services (HHS) in preparing the 4th edition of

the guidelines. The center provided technical support to the Dietary Guidelines Advisory Committee, which issued its report to the Secretary of Agriculture and the Secretary of Health and Human Services in June 1995. The center is the lead Federal agency in coordinating USDA and HHS efforts to publish and promote the Dietary Guidelines bulletin. The Dietary Guidelines for Americans serve as the scientific basis for the center's nutrition promotion activities.

The center also supports USDA as it helps ensure the Federal Government "speaks with one voice" when issuing dietary guidance. A center staff member is the acting chair of USDA's Dietary Guidance Working Group of the Human Nutrition Coordinating Committee. The working group reviews all USDA and HHS publications and materials that contain dietary guidance for the general population and coordinates review with HHS.

New Measures of Eating and Diet Status

The center released two reports that measure Americans' overall diet quality—a *Healthy Eating Index* (HEI), which is food based and uses the five major food groups of the Food Guide Pyramid, and a *Diet Status Index* (DSI), which measures the adequacy of intake of 15 nutrients. Both measure the degree of compliance of respondents with dietary recommendations for total fat, saturated fat, cholesterol, and sodium. The HEI also provides a picture of Americans' consumption from the five major food groups and the variety of foods eaten over 3 days.

The average HEI score for the general population was 63.8 and 63.9 out of a possible 100 in 1989 and 1990, respectively, with 14 percent of individuals in the "poor" range (score below 50) and 75 percent in the "needs improvement" range (score 51–80).

Thrifty Food Plan

The center is responsible for development of the Thrifty Food Plan, which recommends quantities of different foods for providing nutritious household meals and snacks at relatively low cost. Currently, the 1983 plan, updated for inflation, forms the basis of the food stamp allotment. The center updates the food prices and publishes them in a one-page publication, "Cost of Food at Home Estimated for Food Plans at Four Cost Levels, U.S. Average."

In 1995 the center published an evaluation of the nutritional adequacy of the 1983 plan ("Does the 1983 Thrifty Food Plan provide a nutritionally adequate diet at the cost level currently used?" *Family Economics and Nutrition Review* 8(3):2–16, 1995). The paper showed that with the exception of magnesium, the plan meets or exceeds the dietary standards of 1983 used in its development. The plan fails to meet current dietary recommendations for total fat, saturated fat, and cholesterol for most sex-age groups. The center is updating the plan to reflect current dietary recommendations, food prices, and consumption data and is developing new menus and recipes and testing them in low-income households.

Renewed Vision of Nutrition Education

Over the last 15 years a remarkable degree of consensus on diet has developed among U.S. nutrition and health experts. The Dietary Guidelines for Americans expressed in the Food Guide Pyramid is one tangible expression of that consensus. At the same time, an unfortunate disconnect appears: Progress as represented by many of the leading nutrition indices has stagnated or even turned negative. This situation causes grave concern in that diet and poor nutritional patterns are linked with most of the leading causes of death and disease.

The nutrition and health community agree that USDA needs to play a larger role in translating scientific knowledge into nutrition interventions that actually improve the nutrition of the American public. To this end, the center developed a proposal that would mandate USDA to conduct a comprehensive, integrated nutrition promotion and education program to benefit all Americans. The Secretary submitted the proposal to Congress for its consideration in the 1995 farm bill.

The center will move USDA's focus from information transfer to improving the American diet by developing consistent and effective, science-based and consumer-oriented nutrition promotions. This effort represents USDA's commitment to reinventing nutrition education and taking advantage of technological, social, and marketing changes to serve all American consumers.

Nutrition Promoted

The center outlined USDA's renewed vision for nutrition promotion, which included production of a mission statement and strategic plan. The strategic plan was presented at a session of 22 leaders in nutrition education and communications to obtain external guidance and feedback on the center's direction. Reaction was very positive, with specific support for conducting, facilitating, and sharing consumer marketing research to support nutrition promotion.

The center, with support from HHS, conducted focus groups to obtain consumer reactions to selected concepts and presentation styles for the 1995 edition of *Nutrition and Your Health: Dietary Guidelines for Americans*. The results were used to support promotions when the guidelines were published.

Three publications were issued in FY 1995 that advance messages consistent with the Dietary Guidelines. These are (1) "The Food Guide Pyramid: Your Personal Guide to Healthful Eating," a consumer brochure; (2) "Check It Out! The Food Label, the Pyramid, and You," a consumer brochure explaining how to use the new Nutrition Facts Label and the Food Guide Pyramid together to choose

healthful diets, and (3) "Using Food Labels To Follow the Dietary Guidelines for Americans: A Reference," a report for professionals providing background information on the new nutrition labeling regulations and explaining how consumers can use the new labels with the Food Guide Pyramid to select diets consistent with the Dietary Guidelines.

Group To Evaluate USDA Nutrition Education Programs

The center organized an interagency working group to conduct an objective self-assessment of USDA nutrition education programs to maximize their effectiveness for the public and food program participants. Based on the findings, the center is coordinating with other USDA agencies to lead an integrated nutrition promotion and education program.

Magazine Reinvented

The quarterly journal *Family Economics Review* was expanded to include articles on nutrition policy research in addition to family economics research and was accordingly renamed *Family Economics and Nutrition Review*. For the first time, articles by authors outside USDA are being solicited. A distinguished editorial board was named to help select manuscripts and to help the journal identify a niche distinct from other nutrition and family economics journals.

The Cost of Raising and Feeding a Child

Since 1960, USDA has provided estimates of the costs of rearing children from birth through age 17. Estimates are provided for major components of the budget by the age of the child, family income, and region of residence. Results are used in developing state child support guidelines (often used in divorce settlements) and foster care payments so that children receive an adequate standard of living, including access to an adequate diet. The 1995 report "Expenditures on Children by Families, 1994" presents the most recent estimates for husband-wife and single-parent families using data from the 1990 Consumer Expenditure Survey, updated to 1994 dollars using the Consumer Price Index.

Tracking the Nation's Food Supply

The potential of the food supply to meet the nutritional needs of Americans is monitored by examining historical trends and evaluating changes in our diets. The center maintains the National Food Supply Database Management System and publishes the *Nutrient Content of the U.S. Food Supply*. In FY 1995, center staff presented two poster sessions that focused on food supply databases and policy implications. An article, "The U.S. Food Supply Provides More of Most Nutrients," published in the January–April 1995 issue of *FoodReview*, highlights changes in the nutrient content of the food supply over the last 20 years. The center made a significant contribution to the accuracy and interpretation of food supply data in the *Third Report on Nutrition Monitoring*.

Why We Eat What We Eat

The center continually analyzes factors that influence eating patterns and other food-related behavior. The results of such analyses provide information useful in policy making and design and evaluation of nutrition promotions. In FY 1995, center staff published the following articles in a peer-reviewed journal:

- "Differences in the Dietary Quality of Adults Living in Single Versus Multiperson Households" (*Journal of Nutrition Education* 27:113–119, 1995)
- "Who Uses Nutrition Labeling and What Effects Does Label Use Have on Diet Quality?" (*Journal of Nutrition Education* 27:163–172, 1995).

Staff also presented analytic results of their analyses at professional meetings. The topics included the food adequacy, expenditures, and diet quality of families headed by single mothers or married couples; the relationship of knowledge of recommended food group servings to reported consumption; and the personal characteristics and dietary patterns of women who consume recommended amounts of calcium.

Who Eats What

When surveyed, people often report they eat less than they actually do. Such underreporting needs to be evaluated to determine whether adjustments should be made to dietary surveys. A poster session, "The Relationship Between Underreporting of Food Energy in a 24-Hour Recall to the Reporting of Foods and Nutrients," was presented at the Second International Conference on Dietary Assessment Methods, Boston, January 1995.

The center initiated research with the HHS National Center for Health Statistics and the ARS Diet and Human Performance Laboratory to compare interview reports of what test subjects ate over a 24-hour period with a more objective measure of their energy expenditure. People who report less food intake than their energy expenditure and who did not lose weight were underreporting. This ongoing study will help to obtain more accurate measures of individual energy intake in nutrition surveys.

An Action Plan for Nutrition

As follow-up the 1992 International Conference on Nutrition, center staff drafted the U.S. Plan of Action for Nutrition from information provided by USDA, HHS, the Agency for International Development (AID), and the public. The draft adapts the themes presented in the World Declaration and Plan of Action to the United States under the following subjects: eating for health, nutrition security for all, safe food and water from source to table, promoting breast-feeding, nutrition-sensitive food production and economic policy, human nutrition research, and nutrition monitoring.

Convening a Panel of Soy Experts
Vegetable protein products such as those made from soy are offered in school lunches because they are low in fat and present an additional choice in school meal plans. Concerns have been raised, however, regarding the protein quality of some of these products, as well as their potential effects on absorption of iron, zinc, calcium, and other minerals. The center assembled a group of experts to consider the role of soy protein in children's diets and to help the Food and Consumer Service reassess its regulation on vegetable protein products. USDA is striving to bring school meals into compliance with the Dietary Guidelines for Americans.

Diet Appraisal Research Working Group
The Diet Appraisal Research Working Group assesses the nutritional quality of the American diet and the factors that influence it (Food and Nutrition Policy Statement, Departmental Regulation 1020–4). The group shares research plans and proposed research methodologies, provides peer review of research reports, promotes the findings of diet appraisal research, and encourages cooperative projects and joint presentations. The center chairs the working group.

For additional information about the Center for Nutrition Policy and Promotion, contact John Webster (202) 418–2312.

Cooperative State Research, Education, and Extension Service

Congress authorized the establishment of the Cooperative State Research, Education, and Extension Service (CSREES) in September 1994. The agency combines the former Extension Service and the Cooperative State Research Service. Both were the Federal partners in the cooperative systems with the 1862 and 1890 land-grant universities, Cooperative Extension System (CES), and state agricultural experiment stations. The mission of CSREES is to work with its partners and cooperators in advancing research, extension, and higher education in the food and agricultural sciences and related environmental and human sciences.

Cooperative Extension System
Nutrition Impact Indicator Project. During 1992 and 1993, state cooperative extension began a data collection project that would set the stage for data collection on a national scale that would determine the effectiveness of nutrition education efforts within CES. The project used four of the Dietary Guidelines for Americans as the basis for collecting data in 12 states.

Study findings indicate significant changes gained as a result of programming. Participants changed food selection and preparation behaviors. There was an improvement in knowledge and behavior relative to dietary fat and cholesterol; for example, after taking part in the program 30 percent more participants limited their intake of fat and cholesterol and 25 percent more participants increased their knowledge of issues related to fat and cholesterol than before they participated.

Decisions for health. A team of CES nutritionists developed and is pilot testing the Healthy Eating for Life Program in three states. This program targets the nutritional status of people 60 years of age and older and covers health, demographic, social, and educational factors affecting participants' diets.

Forty-eight percent of the program participants responded that they are affected by the messages on cereal boxes. Thirty-two percent said that seeing slender people in advertisements for diet foods affects their eating habits. Forty-eight percent believe that the amount of fruit and vegetables in their diet is about right. These data provide valuable insight into the dietary behaviors and beliefs of elderly Americans clientele and how to reach them with nutrition advice. Contact: Jeanne Priester (202) 720–2920.

Defining public policy issues. CES helps concerned groups of citizens define public policy issues. One active group is nutrition educators interested in the issue of food security. Food security can be defined as access by all people at all times to enough food for an active, healthy life. CES was a partner in developing *Food Security in the United States: A Guidebook for Public Issues Education, 1994*. The book offers basic content about food security and hunger.

National Food Safety and Quality Initiative. CES established the National Food Safety and Quality (FSQ) Initiative 4 years ago, as concerns about the safety of America's food supply increased. The program addresses issues related to microorganisms that cause foodborne illness, such as salmonella and *E. coli*, pesticide residues, food irradiation, and biotechnology. Overall, $22.6 million are spent annually to support food safety and quality, which includes contributions from Federal, state, and local governments. Program funds totaling $2.475 million were awarded competitively in FY 1995 to increase Cooperative Extension's ability to deliver high-quality educational programs in food safety to a wide variety of consumers and industry groups. The program supported projects in 49 states and five territories. More than 10,500 volunteers participated in the FSQ program at state and local levels.

The FSQ Initiative focuses on increasing the adoption of safe food-handling practices, improving practices and processes that safeguard the food supply, and improving understanding of the risks related to food and health. Educational programs target audiences that include consumers, food producers, processors, distributors, and retailers.

States focus their FSQ programs on the needs of specific audiences, including the low income, immigrants, youth groups, and industry groups such as food processors and food retailers. Education and training cover the use of Hazard Analysis and Critical Control Point approaches to food safety; safe food preparation, preservation, and handling; and protection from the risks of pesticide residues, biotechnology, and microbiological pathogens.

One of every two participants in FSQ programs was reported as having adopted practices or changed their behavior in ways that had a positive impact on food safety.

Expanded Food and Nutrition Education Program. CES's Expanded Food and Nutrition Education Program (EFNEP) helps low-income audiences acquire the knowledge, skills, attitudes, and changed behavior necessary for nutritionally sound diets. EFNEP targets two primary audiences—low-income youth and low-income families with young children.

A new evaluation and reporting system measured 14 key practices at entry into EFNEP and upon graduation. When participants enrolled, 2 percent followed acceptable practices for all indicators. At the end of the program, 23 percent had achieved this goal (figure 8). Other results show that 87 percent of participants improved in one or more food resource management practice; 92 percent improved in one or more nutrition practice; and 69 percent improved in one or more food safety practice.

Improvements were found in the intake of six nutrients that are often limited in the diets of low-income people—protein, iron, calcium, vitamin A, vitamin C, and vitamin B_6 (figure 9). There were also substantial improvements meeting recommended dietary guidelines of the Food Guide Pyramid. At entry, 17.2 percent of the participants had a diet that provided half the recommended number of servings of breads and cereals and at least one serving from each of the other food groups. At exit, 42.5 percent had achieved the recommended numbers of servings.

EFNEP families also learned to improve their economic situations by making better use of USDA commodity foods and spending their food dollar wisely. In Wyoming, families typically saved at least $20 to $30 per month on food after completing EFNEP.

Studies conducted 1 to 3 years after graduation from the program show that families continue to practice the new skills and improve the quality of their diets. And, the number of EFNEP families on food stamps and WIC decreases. Some families are able to break their dependence on public assistance programs.

Nutrition Education Initiative.The focus of the Nutrition Education Initiative (NEI) is to change the behavior and promote the nutritional well being of the neediest WIC participants. NEI is funded in 50 states and 6 territories.

One objective is to help participants acquire **behaviors** that contribute to nutritionally sound diets and healthy lifestyles. Some examples are cited next.

In Georgia, 23 percent of project participants initiated breast-feeding compared with 13 percent in the control group. In Michigan, 83 percent of participants initiated breast-feeding and 43 percent breast-fed for 2 months or more; in the control counties 17 percent breast-fed 2 months or more. The 2-month duration rate in North Carolina was 59 percent.

Teen project participants in Georgia increased their average vegetable and fruit intakes by 41 percent and 107 percent, respectively, compared with control groups that showed increases of 9 percent and 7 percent, respectively. In California, 11 percent of the participants improved their diets to include at least one serving from each food group, while 1 percent of the control group made the same improvement. In Pennsylvania, participants increased fruit consumption by 34 percent, vegetables by 27 percent, milk by 31 percent, bread and cereal by 23 percent, and meat by 23 percent.

Guam reported a 93-percent increase in participants' dietary iron intake from intervention. South Carolina reported a 43-percent increase in participants' iron intake and increases of 42 percent in calcium and 23 percent in vitamin C. In New York, participants' intake of iron increased by 11 percent and intake of vitamin C increased by 50 percent over the preintervention level.

Minnesota reported a big behavioral increase in meal planning. The number of participants who planned meals "most of the time" or "almost always" increased from 32 percent to 60 percent.

Another objective is for participants to acquire **knowledge and skills** that contribute to nutritionally sound diets and healthy lifestyles.

In North Carolina, 89 percent of project participants showed increased knowledge of breast-feeding skills. In Iowa, 46 percent of the participants scored 100 on the Lactation Inventory, which measures knowledge of breast-feeding. In Arizona, 81 percent of project participants demonstrated increased knowledge or skill about the diets of lactating women. In Hawaii, 84 percent of the project graduates showed increased ability to interpret food labels and select, buy, and prepare appropriate foods to meet nutritional needs of themselves and their families. In Arkansas, 50 percent of the participants improved their knowledge of prenatal nutrition and practices. In Nebraska, 90 percent of the graduates reported an improved ability to plan meals.

The third NEI objective is to increase **interagency cooperation** in order to reach more of the neediest WIC populations.

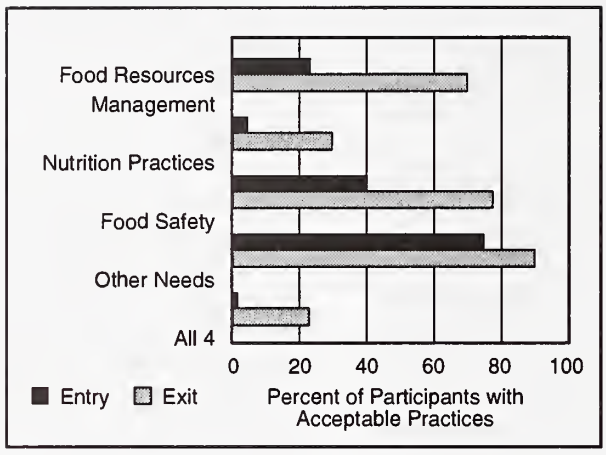


Figure 8. Effect of EFNEP participation on participants' practices

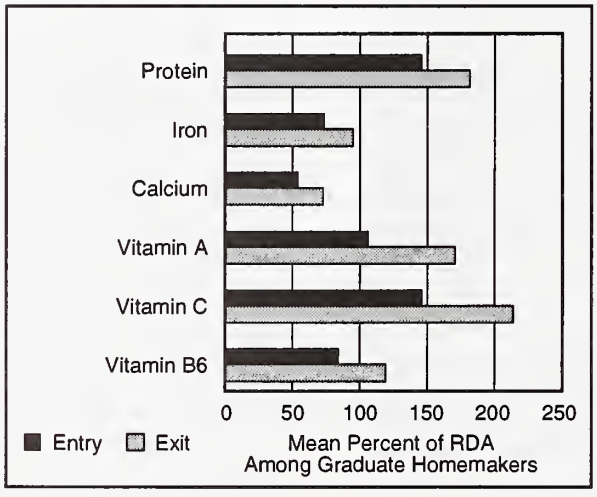


Figure 9. Effect of EFNEP participation on homemakers' nutrient intake

Over 260 WIC clinics nationwide collaborated with CES to support NEI.

CES–Children's Nutrition Research Center Partnership. This partnership between CES and the ARS Children's Nutrition Research Center encourages interplay between nutrition research and education and expands Extension's educational efforts in maternal and child health. A needs assessment of maternal and child health issues drew responses from 49 states and three territories. CES professionals identified the following topics for further research, training, and curricula development: teen pregnancy, breastfeeding, prenatal nutrition, and infant feeding. The need for multicultural materials was also frequently cited.

For additional information about CES, contact Alma Hobbs (202) 720–2908.

National Research Initiative Competitive Grants Program
This program solicits research proposals. Research is supported that contributes to improved human nutrition by increasing our understanding of requirements for nutrients and of other factors that impart optimal health. Data generated from such studies and those conducted to better understand food-related consumer attitudes and behavior form the scientific basis for dietary recommendations.

One aspect of the program—Improving Human Nutrition for Optimal Health— made 28 awards, representing 19 percent of the proposals received. The average award was $68,500 per year, with an average duration of 2 years. The three projects described below typify the issues addressed and the experimental approaches used.

Energy Requirements in Children. Information on nutritional requirements to support healthy growth would be useful to tailor diets to prevent the development of obesity in children, particularly those at greatest risk. This study concerns the daily calories growing children require to support physiological function, growth, and physical activity. Researchers are focusing on black Americans, a population at increased risk of obesity.

Data from the study will be combined with data from previous studies of white children to examine how calorie requirements are affected by factors such as body composition, gender, ethnic background, physical activity, socioeconomic status, geographic location, seasonality, and dietary intake. This information will then be used to generate equations for estimating daily calorie requirements.

Pregnancy Outcome in Diabetics and Nondiabetics. The frequency of birth defects continues to be higher in diabetic than in nondiabetic mothers. The Diabetes in Early Pregnancy (DIEP) study followed 389 nondiabetic and 347 diabetic women through pregnancy. Results showed an increased frequency of malformations in infants of diabetic mothers despite good glucose control during the formation and development of the organs. It seemed, then, that other factors need to be considered. Given that diabetes disturbs zinc, copper, and magnesium metabolism and that deficiencies of these nutrients are teratogenic, it was hypothesized that diabetes-associated micronutrient deficiencies are a factor involved in fetal abnormalities and poor pregnancy outcome in diabetics.

In this study, researchers are determining the zinc, copper, and magnesium concentrations in about 7,000 serum samples from the DIEP study, which represents one of the most comprehensive human data sets ever collected during pregnancy. Since over 3,200 samples were taken during early pregnancy, the researchers can examine maternal mineral concentrations before many malformations and abortions occur. These mineral concentrations during discrete periods of embryonic and fetal development will be correlated to unfavorable pregnancy outcomes, including fetal malformations, spontaneous abortion, intrauterine growth retardation, and birth weight in nondiabetic and diabetic women. As a complement to the human study, researchers are assessing the direct effects of altered serum mineral concentrations on embryonic growth and development using the rat embryo culture technique. Demonstration of a relationship between abnormal maternal mineral concentrations and complications in pregnancy would raise the possibility that giving the mother nutrient supplements may reduce the risk of poor pregnancy outcome in some populations.

Vitamin B_6 Kinetics in Women. The most appropriate method of assessing vitamin B_6 status in humans remains a subject of debate, particularly during stresses such as pregnancy and lactation. Vitamin B_6 exists in 3 basic forms—pyridoxine, pyridoxal, and pyridoxamine—which can be interconverted. Deuterium is a form (isotope) of hydrogen that weighs twice as much as normal hydrogen. Because deuterium is not radioactive, it is called a stable isotope. By replacing some of the normal hydrogen atoms in vitamin B_6 with deuterium, researchers can alter the weight of those molecules. And, because the only difference from normal vitamin B_6 is a slight difference in weight, there is no health hazard associated with the use of stable isotopes. By replacing two hydrogen atoms in pyridoxamine, three in pyridoxal, and five in pyridoxine, researchers can follow each of the molecules even after they are converted to another form.

This project involves giving nonpregnant, pregnant, and lactating women a single dose of a mixture of these molecules and following the appearance of the altered molecules in milk and urine at several intervals over the next 8 hours. It is known that vitamin B_6 metabolism changes during pregnancy and that human milk tends to be low in vitamin B_6. These tests should demonstrate whether pregnancy and lactation alter the rates of interconversions of vitamin B_6 compounds and should identify the sources of vitamin B_6 in milk. This, in turn, will help to determine

more accurately the vitamin B_6 requirements of pregnant and lactating women.

For more information about the competitive grants program, contact Kathleen Ellwood (202) 401–5178.

Cooperative State Research Projects and Special Grants
CSREES administers human nutrition research in partnership with state agricultural extension service offices located at land-grant universities. Projects in progress in FY 1995 are summarized next.

Nutrient Bioavailability. Our understanding is limited of the dietary factors that affect the digestion and absorption of available forms of nutrients, especially vitamins and minerals. Since levels of some of the most affected nutrients—iron, calcium, pyridoxine, folacin—are low in the diets of certain population subgroups, data on bioavailability are important in establishing sound dietary requirements and appraising dietary adequacy. The objectives of this study are to determine the bioavailability of vitamins and minerals in plant- and animal-derived foods in human subjects and to develop methods for determining bioavailability of dietary factors in vitro and in animal models in order to predict human bioavailability.

Dietary Recommendations Designed to Modify Lipid Metabolism. The objectives of this project are to (1) determine the effects of changes in the quantities and ratios of dietary fatty acids on physiological factors influencing health maintenance; (2) determine the impact of diets that meet the Dietary Guidelines, especially with regard to fat and fiber content, on aspects of lipid, lipoprotein, and energy metabolism that influence health maintenance; and (3) assess the impact of diets that meet the Dietary Guidelines on minerals and electrolytes which influence lipid metabolism and health maintenance.

Assessment of Nutritional Risks in the Elderly. The objectives of this study are (1) to evaluate dietary intake methods and screening protocols to identify nutritional risks in the elderly and (2) to determine biochemical indicators of nutritional status as predictors of chronic disease in the elderly.

Factors That Influence the Food Consumption of Young Adults. The objectives of this project are (1) to identify traits, behaviors, concerns, and perceptions that influence the food consumption decisions of young adults and (2) to determine the influence of cultural, behavioral, and perceptual factors and their interactions on the diet of young adults.

Dietary Fat and Fiber: Knowledge, Perceived Risks, and Dietary Practices. Five objectives are addressed in this project: (1) to determine respondents' knowledge and understanding of the Dietary Guidelines for fat and fiber; (2) to determine the degree to which respondents are following the guidelines; (3) to examine respondents' perception of health risks associated with the intake of fat and dietary fiber; (4) to identify constraints to and motivating factors for following these guidelines in relation to population characteristics; and (5) to determine differences between respondents in the general population and those medically defined at risk with respect to knowledge and understanding of the dietary guidelines for fat and fiber, perception of associated health risks, and compliance with dietary recommendations.

Changing Patterns of Food Demand and Consumption. The objectives of this project are to (1) develop and evaluate databases for understanding food demand and consumption behavior; (2) estimate food demand parameters with alternative theoretical and applied models; (3) measure, assess, and interpret changing patterns of food demand and consumption behavior in order to guide food policies, food programs, consumer protection (food safety), and consumer education; and (4) identify and assess changing patterns of food demand and consumption behavior in selected countries for improved understanding of food demand in U.S. export markets.

Better Food Safety Through Control of Toxicants and Antitoxicants. Researchers are assessing the risks of toxicants in food to identify and investigate mechanisms of action of foodborne antitoxicants that may reduce risks to human health. Ten states and the Western Regional Research Center are participating.

Methods To Improve the Well-Being of the Rural Elderly. One objective of this study addresses the effectiveness of dietary management programs on nutritional practices and diet behavior of older people.

Special Grants. The projects in progress in FY 1995 were Integration of Nutrition Goals and Food Systems, at Cornell University; Designing Foods To Improve Nutrition, at Iowa State University; and Dietary Fat, Food Intake, Energy Expenditure, and Body Composition, at Louisiana State University.

For additional information about these programs, contact Melvin Mathias (202) 720–4124.

Higher Education Programs
1890 Institution Capacity Building Grants Program. This program is the center of USDA's high-priority initiative to advance the teaching and research capacity of the 1890 land-grant institutions and Tuskegee University.

In FY 1995, two teaching projects in the human nutrition and food science areas were funded.

- The University of Maryland is strengthening its teaching capacity in human nutrition by forming partnerships with other disciplines to enhance student learning, collaborating with the University of Connecticut to expand faculty

research expertise, providing experiential learning opportunities for students by using the Food and Consumer Service and local agencies, and developing an agreement with a local community college to facilitate transfer to the dietetics program.

- The University of Arkansas at Pine Bluff plans to increase minority enrollment and retention in nutrition and dietetics by 50 percent over a 3-year period. Eight annual tuition scholarships were provided to sophomores. The project will also strengthen links with the Pine Bluff High School Tech Prep Program and promote career opportunities in nutrition and dietetics through summer institutes and study tours for high school students and teachers. With hopes of attracting academically outstanding students, workers developed a computerized booth programmed to present career information. A summer academic enhancement program was developed to assist students who have academic deficits in order to facilitate their progression through the program.

Six research projects were also funded.

- Tuskegee University is strengthening its research capacity in food science. Scientists are evaluating the potential of lysozyme and lactoferricin-B (both natural substances) to enhance the heat destruction of bacteria in liquid egg products. Funds will be used to establish a food microbiology laboratory, which will enhance research, teaching, and industry outreach.

- Tennessee State University is working with researchers and students to expand their knowledge of dietary assessment methodologies.

- Florida A&M University hopes to enhance the commercial viability of muscadine grapes through the development of harvesting, handling, and marketing systems for its fresh fruit.

- Researchers at North Carolina AT&T State University are developing adsorbents for wastewater treatment from low-cost, high-volume North Carolina agricultural by-products.

- Virginia Polytechnic Institute and State University researchers are investigating the use of soy food products to reduce the risk of cardiovascular disease and provide essential information to the public, nutritionists, dietitians, and physicians.

- Researchers at Alabama A&M University implemented a nutrition education intervention program to identify risk factors for cardiovascular disease among 20- to 60-year-old residents of three urban counties in north Alabama and to develop programs to try to reduce these risks.

Higher Education Challenge Grants Program. This program is designed to enable colleges and universities to provide the quality of education necessary for producing graduates capable of strengthening the nation's food and agricultural scientific and professional work force. Projects supported by the program (1) address a regional, state, national, or international educational need; (2) involve a creative or novel approach for addressing the need that can serve as a model; (3) encourage and facilitate better working relationships in the university science and education community, as well as among universities and the private sector; and (4) result in benefits that go beyond the duration of the project and USDA support.

Two of the 47 grants awarded in 1995 were for projects in the food sciences area.

- Oregon State University developed a multimedia instructional product to help students understand how food dispersions (true solutions, colloids, suspensions) influence food quality.

- North Carolina State University developed a self-paced course that explores legal issues related to food. This course, which is available on the World Wide Web, is offered at the university and several other universities and could be used as a model in distance education, thereby enhancing collaborations between universities.

Accomplishments

Cellular Zinc Requirement. Female rats mildly deficient in zinc at the end of pregnancy have delayed and prolonged labor. Researchers at Virginia Polytechnic Institute and State University, seeking the biochemical basis for this phenomenon, found that problems in making the transition from gestation to labor arise from delays in estrogen-directed gene expression in the uterus. The estrogen receptor protein is one of a family of proteins possessing a sequence of amino acids known as the "zinc finger." In the absence of zinc, these proteins bind their hormones but the complex cannot activate gene expression. The scientists proposed that the diverse symptoms arising from zinc deficiency in young animals can be explained as ineffective induction of genes under the control of these hormones. Thus, even a mild zinc deficit could lead to an insidious failure to grow and thrive without showing a specific syndrome.

Vitamin B_6 Linked to Neurobehavior of Infants. Researchers at Purdue University explored the adverse effects of vitamin B_6 inadequacy on brain development in animals. Findings of nerve abnormalities without evidence of growth retardation (usually considered an early signal of nutritional inadequacy) prompted human studies that have focused on determining vitamin B_6 needs in pregnancy and lactation, particularly with respect to infant nutriture. The studies showed that vitamin B_6 concentrations of human milk parallel vitamin B_6 intakes of mothers and, in turn, were

reflected in marked variation in their infants' intakes of the vitamin.

Subsequent interdisciplinary investigations (nutrition, psychology, and medicine) extended this research to examine the relationship of the vitamin B_6 status of mothers to the neurobehavior of their newborns and to mother-infant interactions at 3 to 6 months of age. Newborn behavior, quantified by standardized psychological tests, showed that certain aspects of infant neurodevelopment (for example, consolability, rapidity of buildup to crying, and response to aversive stimuli) were clearly associated with the vitamin B_6 nutriture of their mothers. Furthermore, vitamin B_6 status of mothers was associated with infant alertness and vocalization measured at 6 months of age.

Dietary Influence on Skeletal Tissue. A collaborative study was undertaken by Rutgers University and St. Lukes/ Roosevelt Hospital, in New York, to investigate the effects of weight reduction on physiological indicators (called markers) of bone buildup and breakdown [pyridinium crosslink excretion (PYDX) and serum osteocalcin] and bone mass in obese subjects. Twenty-five women were randomly assigned to a 1200-mg calcium supplement or a placebo. Fifteen women who completed the study (average age of 63 years) lost an average of 10 kg of body weight. In the calcium-supplemented group, the rate of PYDX increased about 30 percent during the first 4 weeks of supplementation. In the placebo group the rates of PYDX excretion increased marginally—about 15—after 1 week of dieting. There were no significant changes in bone mineral density during weight loss in either group.

Interaction of Diet and Antioxidants in Response to Alcohol. There is increasing evidence that alcohol liver toxicity may be associated with free radical injury and oxidative stress. Researchers at the University of Kentucky studied the effects of diet composition on endogenous antioxidant defenses in mice that were fed alcohol. Mice were fed a diet containing high levels of total lipids (35 percent of calories), polyunsaturated fatty acids (PUFA), vitamin A (50x) and vitamin E (8x) or a diet containing lower levels of total lipids (12 percent of calories), PUFA, vitamin A (2.5x), and vitamin E (1x), with alcohol as 31 percent of calories. After 3 weeks, biochemical assays were performed for liver antioxidant defense parameters. Chronic alcohol feeding decreased reduced-glutathione levels and superoxide dismutase activity and increased catalase activity in the livers of mice fed either diet. Glutathione peroxidase activity was depressed by alcohol when the higher fat was fed, but the enzyme activity was not affected by alcohol when the lower fat diet was fed. The higher level of PUFA in the high-fat diet could render the tissue more susceptible to oxidative stress. The agreement among several parameters shows general excess stress. The results suggest that chronic alcohol feeding depresses the antioxidant defenses of the liver, indicating a need to consume foods with antioxidant nutrients if alcohol is consumed.

Evaluating New Sources of Energy for Low-Birth-Weight Infants. The very-low-birth-weight premature infant relies on endogenous protein catabolism (or protein breakdown within the organism) as a source of energy to maintain his or her basal metabolic rate in the early days of life. Paradoxically, protein conservation is critical for the survival of these infants. Presently available energy sources are inadequate to achieve this goal of protein conservation given the limitations of concentrations and volumes of intravenous infusions that can be used. Researchers at the University of Wisconsin-Madison sought to establish in newborns a quantitative relationship between outside energy sources and prevention of endogenous protein catabolism by using urinary nitrogen excretion as an indicator. Results involving 40 newborn piglets suggest that newborn animals may lose up to half of their body protein by a system or systems not previously identified. Infusion of exogenous energy results in decreased urinary nitrogen, but the protein content of body components the piglets used as fuel remained constant. This latter observation suggests that reutilization of amino acids from protein breakdown may be the limiting factor and that supplementation with specific amino acids may enhance nitrogen retention when supplemental energy is provided intravenously.

Nutritional Needs of Disabled Children. A graduate student at Iowa State University emphasized early intervention for children with disabilities who receive interdisciplinary, family-centered care. In-depth nutrition assessment and intervention were carried out with 120 children. More than two-thirds were followed for 3 years. Intervention resulted in a significant improvement in weight and height among the children. New initiatives follow infants as they are discharged from a neonatal intensive care unit. By staying in contact with parents as they begin to feed these small infants who are at risk for developing nutritional problems, the researchers hope to be able to supply needed intervention early in an infant's life and improve growth patterns.

Breakfast Patterns in Early Childhood. Breakfast is essential to the nutritional health of children. Besides optimizing physical growth and development, breakfast enhances attention, alertness, and other skills important for academic success. Researchers at Rutgers University surveyed mothers of 3-, 4-, and 5-year-old children at home, in university-based preschool or day care centers, and in regional Head Start programs. The mothers were asked about their children's breakfast routines. Results showed that in comparison with Head Start children who ate breakfast at school, children in private programs were much less likely to eat a breakfast in accordance with recommendations of the School Breakfast Program.

With support from the New Jersey Department of Education, the researchers began a breakfast program for preschool-aged children that met the School Breakfast Program guidelines. Analysis of children's breakfasts before and during the programs showed a decrease in sugar and

increases in carbohydrate, protein, and total calories, with the percentage of calories from fat remaining at less than 30 percent.

Have a Healthy Baby. In Kansas, 8.7 infants die before their first birthday for every 1,000 live births, a mortality rate higher than the national rate. Key components in solving problems of infant and neonatal mortality are early nutrition intervention and support throughout the pregnancy. The Have a Healthy Baby Program was developed in Indiana by the Purdue University EFNEP. The program consists of five lessons to help pregnant teens and adults deal with issues of daily nutritional choices and life-style choices that affect a baby's health, such as drugs, alcohol, and smoking.

EFNEP has used the program in three Kansas counties since 1992 and recently expanded it to 10 additional counties. High-risk mothers in the program reduced their incidence of low-birth-weight babies from an expected 10 percent to 5.7 percent.

WIC Kitchen. The WIC Kitchen is a Kansas program that focuses on food selection and preparation and is intended to supplement the basic nutrition education provided through the WIC program. The WIC Kitchen includes five lessons, one on each Food Guide Pyramid group, which cover making low-fat food choices, nutrition for young children, food safety, parenting skills, food labeling, ideas for leftovers, shopping tips, and suggestions for meal planning.

The program was used by seven counties in 1994 and 16 additional counties in 1995. Results from seven counties indicate the participants were better than the controls in comparing food prices, handling food more safely, and allowing children to participate in meal preparation. Participants also consumed more grains, fruits, vegetables, and milk and less candy, desserts, and sweets. Children of participants ate breakfast more often than children of the controls.

Saved by the Pyramid. Saved by the Pyramid is a school nutrition education program for children too young to be in a 4–H program. The curriculum consists of seven lessons for children in the fourth grade. An EFNEP staffer teaches monthly lessons to a class of teachers and one or two fourth-grade volunteers. The fourth graders then return to their classroom and teach the 45- to 60-minute lesson.

In 1994–95, the program was implemented in 4 counties and reached 735 students, 22 teacher volunteers, and 44 peer teachers. Participants' nutrition scores on the pretest averaged 5.6 out of a possible 8 and on a post-test 6.2, indicating an 11-percent increase in knowledge.

Safe Food-Healthy Children. The Safe Food-Healthy Children program teaches child care providers about safe food handling, including foodborne illness, the importance of cleanliness, safe preparation and storage, and special feeding situations. The program is a joint project of the University of Georgia CES and North Carolina State University CES and is funded by the National Food Safety and Quality Initiative. The program reaches about 300 child care providers.

Participants completed pre-, post-, and post post-tests to determine changes in knowledge, attitudes, and practices. Scores reflecting knowledge increased by an average of 14 and 17 points in Georgia and North Carolina, respectively. Hand washing was the most frequently targeted practice for adoption or strengthening. Two months following the program 95 percent of the respondents indicated they followed their targeted practice most of the time. Of 263 participants, 93.5 percent indicated they would attend a similar videoconference if offered. The videos and accompanying materials are available nationwide.

Heart-Healthy Menus for Kids. Heart-Healthy Menus for Kids is a program to help reduce the amount of fat in children's menus offered by home day care providers. The program is taught by the EFNEP home economist in Shawnee County, KS.

Training participants total 178 day care providers of about 1,500 youth. According to a follow-up evaluation conducted 6 months after the training, 91 percent served prebreaded meats less often; 96 percent served luncheon meats and hot dogs less often; 89 percent reduced the amount of margarine, butter, and sour cream in cooking or served at meals; 84 percent more thoroughly drained or rinsed the fat from ground meat; 91 percent baked, steamed, or broiled foods more often, as opposed to frying foods; and 93 percent served more fruits and vegetables for snacks.

Better Mothers and Children. Nutrition education suffers from a lack of culturally appropriate, low-literacy educational materials. About 68 percent of the health and patient educational materials in the United States are written at or above the 10th grade level, too high for most limited-resource people. Six low-literacy, bilingual modules using compact disks provide interactive feedback for participants on a variety of topics. The modules were developed during the first 2 years of this NEI project. Three modules teach maternal and early childhood nutrition. Two modules—Health During Pregnancy and Feeding Infants and Children—teach mothers about nutrition. The Kitchen Magician module teaches nutrition and food safety to children ages 3 to 7. Interactive multimedia combine sound, animation, graphics, and video to deliver information in a mode that invites user interaction. Although the modules are written at a 5th grade reading level or lower, a voice-over provides information for nonreading clients. All materials are available in English and Spanish.

Some results from modules field tested by WIC participants follow: WIC clients have used the modules to improve reading skills; many participants expressed a desire to bring

in their children because of the children's module; a 3-year-old navigated the program without adult intervention; and adult clients also explored the modules without staff prompting or assistance. The modules are located in six Texas WIC sites.

Teaching Food Safety to Young Children. The poverty rate for Kentucky's children increased 21.2 percent between 1979 and 1989. Almost a full one-fourth (24.5 percent) of the state's children live in poverty. Consequently, they are at high risk for hunger, poor nutritional status, illness, and secondary complications. These issues were addressed by an EFNEP and WIC joint venture that began in October 1994 in seven pilot sites.

The project focused on improving nutrition and food safety of children ages 3 to 9 years. Over 500 children have participated in the project to date. Extension agents and EFNEP paraprofessionals from the remaining 113 counties have begun using the lessons and materials.

Pediatric Obesity: The California Model. An interdisciplinary committee on children and weight designed, implemented, and evaluated a multidimensional approach for making an impact on the increase of pediatric obesity in California. In order to stimulate community action, an in-service training kit entitled: "Children and Weight: What Health Professionals Can Do About It" was produced by the University of California Cooperative Extension (UCCE). UCCE also produced a series of pamphlets, including two low-literacy pamphlets, and a videotape to be used with high-risk families.

Three weeks after the training, all participants received a questionnaire for evaluating the effectiveness of an initial series meetings. All of the health professionals indicated they felt more empathetic toward large children and adults as a result of the training. The greatest knowledge gains concerned factors contributing to the development of obesity in children and the theory and practice of weight management in children. Seventy-three percent of participants said the training influenced the advice they give to clients.

To date, UCCE has trained over 10,000 health professionals, including dietitians, nurses, pediatricians, psychologists, therapists, health educators, home economists, and physical educators. Interest in approaches to preventing and treating pediatric obesity appears to be on the increase, and this program has been adapted for use by other states and agencies.

For additional information about higher education programs, contact Lois Davis (202) 720–1973.

Economic Research Service

The Economic Research Service (ERS) provides economic and other social information and analysis for improving the performance of agriculture and economic well-being of rural America. The information helps Congress and the administration develop, administer, and evaluate agricultural, food, and rural policies and programs. ERS produces economic and social science information to support policy and program decision-making and legislated mandates related to consumer behavior and food choices, food assistance and nutrition programs, nutritional adequacy of diets, and food security. The agency also maintains indicators of individual, household, and market-level food consumption, expenditures, and nutrients. The research and analysis focus on the sociodemographic and economic determinants of food and nutrient consumption, the costs and benefits of food assistance and nutrition programs, and the role of consumer information in food choices and diet quality.

Food Supply Data. ERS is responsible for one of the five components for monitoring nutrition in the National Nutrition Monitoring and Related Research Act of 1990 and the Ten-Year Comprehensive Plan. U.S. food supply statistics measure national consumption of several hundred basic commodities. The data are a long, continuous series published first in 1941 and extended back to 1909 for most commodities. They are the only data on food and nutrient availability in this country. ERS commodity experts continue to update new series and improve existing data to better reflect market conditions, fill voids, and improve estimates of food supplies.

Annual Food Supply Bulletin. ERS analysts prepare an annual statistical bulletin on the food supply. The most recent edition is titled *Food Consumption, Prices, and Expenditures, 1970–93* (ERS, Statistical Bulletin No. 915, December 1994). This bulletin presents historical data on per capita consumption of major food commodities in the United States, including basic data on supplies and disposition. In addition, data concerning population, income, prices, and expenditures related to food consumption were assembled for statistical and economic analysis of food consumption. The data in the report are also available in an electronic database. Work on the 1995 bulletin is nearly complete. Contact: Judy Putnam (202) 501–7413.

An article about trends in per capita food availability entitled "U.S. Per Capita Food Consumption: Record High Meat and Sugars in 1994" was published in *FoodReview* (ERS, 18(2):2–11, May–August 1995). An article about fruit and vegetable consumption, "The New Cornucopia of Produce," appeared in *Agricultural Outlook* (213:17–18, November 1994).

Comparing Food Disappearance Data to Dietary Recommendations. ERS conducted a study to compare the foods and nutrients provided by the nation's food supply with the dietary recommendations in the Food Guide Pyramid. By measuring the gap between food disappearance and dietary guidance, the study showed the direction and magnitude of changes that most Americans need to make to meet health recommendations. Because food supply estimates can overstate actual consumption by including food discarded in processing, lost in spoilage, thrown away at home, or fed to pets, the data were adjusted to more closely approximate actual human consumption and to facilitate comparison with the pyramid's serving-based guidelines. The results of the analysis were published in *FoodReview* in the fall of 1996. Contact: Linda Scott Kantor (202) 219–1264.

Food Choices

ERS documents and analyzes changes in patterns of food consumption and expenditures by understanding the role that prices, income, sociodemographic factors, advertising, and nutrition education play in molding food choices and household food budget.

Food Spending. Average annual food expenditures in urban households rose 59 percent from $985 per person in 1980 to $1,567 in 1992, while per person income rose 94 percent from $6,916 to $13,398. As a result, the percent of household income spent on food declined from 14.2 to 11.7 percent from 1980 to 1992. Annual spending per person for food consumed at home rose 55 percent from $667 to $1,036, and spending on food consumed away from home rose 69 percent from $318 to $536. During this period, food prices increased 58.9 percent for total food, 54.8 percent for food eaten at home, and 68.7 percent for food eaten away from home.

The report, *Food Spending in American Households, 1980–92* (ERS, Statistical Bulletin No. 888, October 1994) presents trends in household food expenditures for major food groups by selected demographic factors. Information is also presented on household income and food price trends. Contact: David Smallwood (202) 219–1265.

Total Food Expenditures. Americans spent $617 billion for food in 1993 and another $86 billion for alcoholic beverages. Away-from-home meals and snacks captured 46 percent of the U.S. food dollar in 1993, up from 34 percent in 1970 and 24 percent in 1950. ERS prepares annual statistics of total dollar expenditures for food eaten at home and away from home—figures that include all food, regardless of who pays for it. Total food expenditures are further broken down into the share paid for by families and individuals and those paid for by governments and businesses. Annual statistics are published in *Food Consumption, Prices, and Expenditures* and monthly figures in *Agricultural Outlook*, both published by ERS. Contact: Alden Manchester (202) 219–0832.

Iron Intake of Preschoolers. An ERS study investigated household income, food program participation, and diet awareness and attitudes of the household meal planner as predictors of the dietary iron intake of preschoolers. Non-breast-feeding children, 1 to 5 years of age, with 3 days of dietary data from the 1989–91 Continuing Survey of Food Intake by Individuals (CSFII) were included in this sample. Two measures of intake were analyzed: (1) a nutrient adequacy ratio (NAR), defined as iron intake divided by the Recommended Dietary Allowance and (2) an index of nutritional quality (INQ), or diet density measure, which is the ratio of iron NAR to energy NAR. Data from the concurrent Diet and Health Knowledge Survey were used to create indicator variables for meal planners who were aware of anemia as a health problem related to iron intake and who felt it was important to choose a diet with plenty of grain products.

Household income and participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) were positively associated with both iron intake measures. Participation in the Food Stamp Program was positively associated with the iron NAR but not the INQ. Although awareness of anemia was not a significant predictor of intake, children from households whose main meal planners had a positive attitude about the importance of grains, consumed more iron as measured by either index. The findings suggest that the dietary iron intake of preschoolers continues to be affected by economic factors and that food assistance and educational interventions may be useful in improving these intakes. For additional information, see "Socioeconomic Factors Associated with the Iron Intake of Preschoolers in the United States," *Nutrition Research* 15:1297–1309, 1955, or contact Donald Rose (202) 219–0885.

Effects of Socioeconomics on Fiber Intake. Effective nutrition education programs require a knowledge of the socioeconomic characteristics of current and potential participants, their current levels of nutrient consumption, and their knowledge of health issues related to diet. The main meal planners in American households consume about 10 to 13 g of fiber per day, about half the recommended amount. Meal planners who consume more fiber than average tend to be male, older, white or Hispanic, have more than a high school education, and live in rural areas. Meal planners who consume less fiber than average tend to be black, reside in the North Central States or the West, live in large households, smoke, or participate in the Food Stamp Program or WIC. For further information, see *Dietary Fiber: Effects of Socioeconomic Characteristics and Knowledge,* ERS, Technical Bulletin No. 1840, December 1994, or contact Noel Blisard (202) 219–1264.

New Groupings Affect Results of Food Consumption Studies. The article "Aggregation, Flexible Forms, and Estimation of Food Consumption Parameters" (*American Journal of Agricultural Economics* 77:525–532, 1995) assesses the importance of the named factors in estimating aggregate food consumption parameters. A flexible food-demand model that uses alternative specifications was estimated using U.S. data. Foods were aggregated based on a new grouping scheme adopted from the Dietary Guidelines for Americans. The influence of socioeconomic variables on consumption and nutrient intake was analyzed. Price, income, and demographic effects were found to be highly significant. Contact: Donald Rose (202) 219–0885.

Body Mass Index and Income Status. Various studies report an inverse relationship between body mass and income status for U.S. women. ERS analysts hypothesized that income might represent a proxy for certain health behaviors related to body mass. This theory was investigated using a sample of 2,677 nonpregnant, nonlactating women aged 19 and older from the 1989–90 CSFII. Researchers found that income was inversely related ($p<0.001$) to BMI (BMI= weight in kg/height in m^2) in a model that controlled for age, schooling, race, Hispanic origin, and other socio-demographic characteristics such as region, urbanization, and household size.

In a second model, which controlled for the above factors as well as for smoking, alcohol intake, level of physical activity during leisure time, daily hours spent watching television, and calorie intake, analysts found that income continued to be inversely related to BMI ($p<0.001$). Those below the poverty level were on average 0.70 units of BMI larger than those above the poverty level. Some researchers suggested that cyclical weight loss improves metabolic efficiency and may lead to an increase in BMI. If true, food insecurity with corresponding cyclical weight loss may be a missing factor that helps explain the persistent inverse relationship of income to BMI. Contact: Donald Rose (202) 219–0885.

Food Energy Steady as Alcohol Intake Increases. ERS nutritionists analyzed variations in energy and macronutrient intake by level of alcohol consumption in a large sample of adults who participated in the 1987–88 Nationwide Food Consumption Survey. The analyses show that drinkers in the sample did not tend to substitute alcohol energy for food energy; rather, they added alcohol energy to their diet. Despite the fact that total energy intake increased with increasing alcohol consumption, the analysts did not observe an increase in body mass index (BMI) for women. Among the men, heavy drinkers had a higher BMI than light drinkers. Little difference in grams of macronutrient intake was noted, although fat and protein intakes tended to increase for men. (For more information, see "Food Energy Remains Constant With Increasing Alcohol Intake," *Journal of the American Dietetic Association* 95:698–700, June 1995). Contact: Donald Rose (202) 219–0885.

The Effectiveness of Nutrition Education

Evaluation of Great Beginnings. The University of New Hampshire Cooperative Extension developed a nutrition education program called Great Beginnings, for pregnant adolescents and young mothers who participate in the WIC program. ERS is helping evaluate the program in areas such as nutrition knowledge, diet quality, and selected anthropometric-health measures. The evaluation covers not only the short-term links from education to knowledge to changed behavior, but also the long-term link to real health outcomes.

Evaluation of Nutrition Education Initiative. An ERS report summarizes the progress of 18 nutrition education projects in their first year of operation. The projects were awarded funds under the WIC Nutrition Education Initiative. (For more information, see "The ES/WIC Nutrition Education Initiative: Progress in the First Year," ERS Staff Paper 9515, 1995). Contact: Donald Rose (202) 219–0885.

The Economic Costs of Poor Diets

Estimates suggest that about 300,000 deaths per year are attributable to consumer choices regarding diet and physical activity. ERS initiated research to quantify the economic costs of poor diets to society, as well as to improve our understanding of the role of consumers' knowledge, attitudes, and awareness about diet and health issues on food choices and nutrient intake. Preliminary results were published in *FoodReview* ("The High Costs of Poor Diets" 17(1):2–3, January–April 1994).

Health and Economic Consequences of the American Diet. Poor diets are associated with four of the leading causes of death in the United States—heart disease, cancer, stroke, and diabetes—including the top three. They are also associated with other health conditions that contribute to premature mortality or reduced quality of life and productivity. An ERS report provides information on the incidence, prevalence, and costs of health conditions commonly associated with poor diets and inadequate activity. Current dietary patterns are compared with Federal dietary recommendations. Possible reasons for the dietary patterns and USDA's efforts to improve diets are also described. (For more information, see *The American Diet: Health and Economic Consequences,* ERS, Agriculture Information Bulletin No. 711, February 1995). Contact: Betsy Frazao (202) 219–0911.

The Role of Information in Fiber Intake. Measuring the effect of information on an individual's intake of dietary fiber is crucial in understanding and quantifying the linkage between nutrition education programs and actual behavior. An ERS study uses dietary information and intake data from a sample of U.S. household meal planners to estimate the

effect of information on dietary fiber intake. Results indicate that attitudes about eating high-fiber foods and awareness of the connection between dietary fiber intake and some diseases are important determinants of an individual's fiber intake. (For more information, see *Modeling Nutrient Intake: The Role of Dietary Information,* ERS, Technical Bulletin No. 1842, May 1995). Contact: Jay Variyam (202) 501–7420.

Responding to Consumers' Nutrition Concerns. As awareness of the diet-health link has increased, consumers have changed their diets. Although there is still considerable room for improvement, nutrition concerns have become an important factor in food choices. Both the food sector and the Federal Government responded to consumer concerns about nutrition by improving the nutrient profile of food products and the information on food labels. Technological advances in food processing have given the food industry new tools likely to accelerate the introduction of tasty healthier foods. Changes in what, where, and how food products are produced present unlimited opportunities for domestic and foreign producers and food manufacturers who can identify, respond to, or create new consumer food desires. (For more detail, see *Consumer Concerns About Nutrition: Opportunities for the Food Sector*, ERS, Agriculture Information Bulletin No. 705, October 1994.)

Domestic Food Programs

USDA administers 14 domestic food assistance programs, which account for over 50 percent of the USDA budget or about $40 billion. Working closely with the Food and Consumer Service, ERS provides analyses of program costs and benefits, determinants of participation, market impacts, and input for budget projections. ERS conducted much of the regulatory impact analysis for the Department's proposed school lunch reform.

Economics of Proposed Reforms in the Food Stamp Program. ERS economists examined the economic consequences of reforms in the Food Stamp Program on food spending, gross farm income, farm program costs, and the general economy. The analysis shows the effects of cashing out the program could be as much as four times larger than the effects of program reductions alone. (For more information, see "Proposed Reforms in the Food Stamp Program: Economic Impacts on Agriculture and the Economy," ERS Staff Paper No. AGES–9516, August 1995). Contact: Dave Smallwood (202) 219–1265.

Book Examines Food Aid Policy and Economics. An ERS economist contributed to a book on agriculture and policy in which he and his co-author explore aspects of domestic food aid programs, including controversial policy issues surrounding individual programs; estimates of benefits to recipients, producers, and society; and future expectations for food aid. (For additional information, see "Domestic Food Aid Programs." *In* Milton C. Hallberg, Robert G.F. Spitze, and Daryll E. Ray, eds. Food, Agriculture, and Rural Policy into the Twenty-First Century: Issues and Trade-Offs, pp. 135–152. Westview Press, Boulder, CO. 1994. Contact: Dave Smallwood (202) 219–1265.

Maximizing Participation in the Food Stamp Program. A 1990 study from the General Accounting Office implies that programs which inform households of their eligibility for food stamps should be directed to groups with the greatest number of eligible people. An ERS economist writes that the economically efficient use of outreach expenditures may require concentrating efforts on groups of households with fewer but more responsive uninformed nonparticipants. (See "Maximizing the Expected Food Stamp Program Participation From Informational Outreach Programs," *Journal of Agricultural Economics Research* 45(3):3–9, Fall 1994. Contact: Bill Levedahl (202) 219–0856.

Data from the Panel Survey of Income Dynamics indicate that one-fourth of the households eligible for the Food Stamp Program do not know they are eligible. An ERS economist estimated that information outreach programs directed to these households have the potential of increasing the overall participation rate up to 18 percent and benefit payments by 12.6 percent. These results can be useful in establishing realistic goals for information outreach for the program. (See "How Much Can Informational Outreach Programs Increase Food Stamp Program Participation?" *American Journal of Agricultural Economics* 77: 343–352, 1995.

Food Security and Hunger

Characteristics of Food-Insecure Households. ERS examined data from 4,406 households interviewed in the 1989–90 CSFII to determine the socioeconomic characteristics associated with self-reported food insecurity. Households were considered food insecure if they reported they sometimes or often did not have enough to eat. Households that had incomes below the poverty level or that rented their dwelling were more likely to report food insecurity ($p<0.05$) than others. Food insecurity was also more likely to be reported in households headed by blacks or single males but not in those headed by single females. Households headed by persons in their 70's and older or with at least some college education were less likely to report food insecurity. Variables such as Hispanic origin, region, urbanization, and participation in the Food Stamp Program and WIC were not significantly associated with food insecurity. According to the results, the strongest predictor of food insecurity is poverty as determined by income and household size. For more information, see "Characteristics of Food Insecure Households in the United States," paper presented at the annual meeting of the American Public Health Association, Washington, DC, October 1994). Contact: Donald Rose (202) 501–7414.

Keeping Tabs on Hunger. The most recent USDA surveys, based on data from the late 1980's and early 1990's, indicate that 2 to 4 percent of U.S. households report not getting enough to eat. Other studies show hunger ranging from 11 to 13 percent for the same time period. Such discrepancies led to recent efforts to improve the way hunger is defined and monitored. A new national survey will help assess the nature and extent of hunger in America and provide detailed information on how people cope with it. (See "Improving Federal Efforts to Assess Hunger and Food Insecurity," *FoodReview* 18(1):18–23, 1995). Contact: Donald Rose (202) 501–7414.

Economics of Food Markets. ERS's Food Markets Branch analyzes the efficiency of food marketing, processing, and distribution industries in meeting changing consumer demand. The branch monitors and reports food prices, marketing costs, and the Consumer Price Index (CPI) for food—indicators of the well-being of consumers and the food industry.

The Farm-to-Retail Price Spread. Congress directed USDA to measure price spreads for food originating on U.S. farms. An ERS report presents findings for 1994. Retail food prices in 1994, as measured by the CPI, averaged 2.4 percent above those in 1993. This increase was slightly greater than 1993's rise of 2.2 percent and only slightly less than the 2.6 percent gain in the CPI for all goods and services. Food price inflation in 1994 was smaller than the overall increase in the CPI for the fourth consecutive year. The 1994 economy yielded the largest aggregate employment growth of the last decade. Higher wages and salaries produced the strongest growth in per capita personal income since 1988. Sales of food purchased in grocery stores rose slightly in real dollars. Meanwhile, consumer confidence was more strongly manifested at eating places, where real spending grew 5.2 percent. These spending patterns translated into higher demand for the marketing and processing services required to bring food from the farmer to the consumer. (See *Food Cost Review, 1994,* ERS, Agricultural Economic Report No. 729, October 1995). Contact: Howard Elitzak (202) 219–1254.

Indicators of Retail Food Prices. ERS forecasts the CPI for all food, including food consumed away from home and at home. An annual forecast is released each year in the January–February issue of *Agricultural Outlook* and updates appear periodically in the same publication (ERS, published 11 times a year). Copies are available from Annette Clauson (202) 501–6552.

Food Marketing System. Total sales in the U.S. food marketing system grew by 4.2 percent in 1994 to nearly $800 billion. Sales at food stores accounted for 42 percent of that figure; sales at restaurants, 34 percent; and sales of nonfood items and alcoholic beverages, 24 percent. Value added by the food system represented about 81 percent of each food dollar spent. Food marketers introduced nearly 15,000 new food items in 1994. Profits for food processors and food retailers continued at record levels. Americans spent 10.7 percent of household income to buy food in 1994, a new low. A report *The Food Marketing System in 1994* (ERS, Agriculture Information Bulletin No. 717, August 1995) analyzes and assesses yearly developments in the nation's food marketing system. These developments relate to industry growth, conduct, performance, and structure of the institutions, food processors, wholesalers, retailers, and food-service firms. Contact: Tony Gallo (202) 219–1260.

Alternatives for Improving Food Safety

A new Food Safety Branch, created when ERS reorganized in 1995, conducts long-run basic economic research and short-run policy analysis to expand our knowledge of the costs of unsafe food consumption and the benefits of increased food safety.

In February 1995, the branch chief briefed the staffs of the House and Senate Agriculture Committees about economic issues associated with food safety. This briefing summarized the knowledge about the costs of pathogen-related foodborne diseases and the potential risks from exposure to pesticide residues in fresh fruits and vegetables. The branch worked closely with the Food Safety and Inspection Service to provide costs-of-illness data for foodborne pathogens in support of the Department's initiative to reform meat and poultry inspection. It also sponsored a conference in January 1995 entitled "Tracking Foodborne Pathogens from Farm to Table." This conference brought together researchers from a variety of disciplines to discuss the latest findings on pathogen-related foodborne illness, identify data needs, and plan research activities to increase our understanding of foodborne pathogens.

Publications include *Bacterial Foodborne Disease: Medical Costs and Productivity Losses, 1993*, which describes the costs of illness analysis used to develop estimates of the costs of pathogen-related foodborne illness. New research is under way to estimate the costs to industry of complying with new meat inspection programs and to expand the cost of illness estimates to include additional microbial pathogens.

The branch is also researching the economic consequences of dietary exposure to pesticide residues in food and water. Using 1992 data from the USDA Pesticide Data Program on pesticide residues in fruits and vegetables, staff completed an assessment of the dietary exposure to pesticide residues in 10 fresh fruits and vegetables. Research showed that exposure risk came from four sources: on-farm pesticide use, postharvest application of pesticides, imported products, and chemicals no longer used in farming that persist in the soil.

Research also was conducted on the consequences of exposure to farm chemicals in drinking water. Using a nationwide survey about environmental issues, researchers asked consumers to value the benefits of reducing exposure to nitrates in drinking water (from fertilizer use on cropland). Research is under way to update dietary exposure estimates using 1993 data from the Pesticide Data Program and to evaluate the potential for dietary exposure in different segments of the population.

Food and Consumer Service

The Food and Consumer Service (FCS) offers needy Americans access to a healthful diet through food assistance programs and nutrition education. FCS programs include—

- Team Nutrition, child nutrition programs, comprising National School Lunch Program, School Breakfast Program, Child Nutrition Labeling, Nutrition Education and Training Program, Special Milk Program, Summer Food Service Program, Child and Adult Care Food Program
- Food distribution programs, consisting of Food Distribution Program, Commodity Supplemental Food Program, Food Distribution Program on Indian Reservations
- Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and WIC Farmers, Market Nutrition Program
- Food Stamp Program.

Team Nutrition

FCS developed Team Nutrition as a national nutrition education and promotion strategy, using academicians, food industry professionals, commodity groups, and concerned individuals to devise and implement the strategy. Contact: Alberta Frost (703) 305–2590.

Team Nutrition Supporter Network. Over 200 organizations, including nutrition, health, education, and food industry groups, support Team Nutrition's mission and guiding principles.

Disney Adds Its Support. The Disney Company is providing Team Nutrition "spokestoons" Timon and Pumbaa from the animated film "The Lion King" to promote health to elementary school age children. The characters appear on posters, in school displays, and in special events. Timon and Pumbaa are also featured in public service announcements distributed through Disney home videos and TV networks and are included in the Scholastic, Inc., classroom curriculum.

Scholastic, Inc., a Partner. Scholastic, Inc., joined USDA in developing the Team Nutrition in-school program, which includes age-specific curricula, children's magazines, parents' guides, posters, and videos for helping children adopt good nutrition habits. To reach 92,000 schools nationwide, USDA provides materials to the first 10,000 elementary schools to enroll in Team Nutrition, and Scholastic distributes materials to other schools through direct sales, corporate sponsorship, the Internet, and satellite uplink.

National PTA Targets Parents. The PTA distributed nutrition education materials to get parents involved in helping their children choose a healthy diet. Ninety-thousand activity planners and 300,000 sets of parents' guide materials have been distributed thus far.

California Joins the Team. California, through its Department of Education, is the first state to join Team Nutrition, thus demonstrating its commitment to integrating nutrition education in schools.

Team Nutrition Schools Begins. Team Nutrition Schools is an incentive program that coordinates Team Nutrition activities at the local level and encourages schools to share successful ideas and strategies. It is the local link in the School Meals Initiative goals. A national network of schools will demonstrate results of changes in school meals and showcase success of their nutrition education programs. Team Nutrition Schools involve teachers, students, parents, food-service personnel, and the community in interactive nutrition education activities with classroom and cafeteria components.

The Great Nutrition Adventure. This endeavor involves volunteer chefs in local school cafeterias and at classroom events that promote healthy school meals. A package, including a videotape, an event planner, and other promotional materials, was distributed to 23,000 school districts.

The Missing Pyramid. A children's book is being written by award-winning author Susan Shreve to promote healthy eating habits to first through third graders.

Exhibit Booth Designed. A Team Nutrition booth travels to family, nutrition, health, and education conferences. Team Nutrition staff participate as exhibitors, speakers, and panelists.

Team Nutrition On-Line.
A mailbox was set up on the Internet for Team Nutrition inquiries. The address is <teamnutrition@reeusda.gov>.

Team Nutrition Connections. A quarterly update was developed to keep Team Nutrition partners and others informed about activities.

HHS and DOE Lend a Hand. Nutrition education is being made a priority in the Interagency Committee on School Health, which brings together over 40 Federal agencies. The Department of Health and Human Services and the Department of Education distribute and promote Team Nutrition materials through regional, state, and local affiliates.

DOD Pitches In. The Department of Defense is implementing a project that tests new ways of delivering fresh fruit and vegetables to states and schools.

Action Kit Developed. A community nutrition action kit was developed and distributed through home economists in nearly 3,200 counties and 4–H clubs, and via electronic bulletin boards and other communication technologies. The first edition, designed for grades 3–6, their families, and community volunteers, includes nutrition education materials for the entire community.

Commodity Improvement Council Works Up Nutrition Policy. The council, composed of USDA under and assistant secretaries, is developing policy to promote the health of school children by improving the nutritional profile of USDA commodities while maintaining the Department's support for domestic agricultural markets.

Training Grants Awarded. USDA identified Team Nutrition training grants as an "anchor delivery system" for implementing USDA nutrition requirements and the Dietary Guidelines in school meals. The grants are made to state agencies that administer the National School Lunch Program to give training and technical assistance to school food-service professionals. Nineteen grants, four of which are state consortiums, were funded at approximately $3.4 million in 1995.

Handling Fresh Produce. FCS headquarters and regional staff and some state distributing agencies received training on the procurement, storage, and use of fresh fruits and vegetables with the help of the Fresh Produce Marketing Association.

A Tool Kit for Healthy School Meals. USDA, in cooperation with Pennsylvania State University and others, developed 53 new recipes for use in the National School Lunch and School Breakfast Programs to meet the Dietary Guidelines and use USDA commodities. These recipes are part of a package of materials that include nutrient analysis of each recipe, a marketing manual to promote the healthier recipes, and a training manual for school food-service personnel.

Training in Providing Healthy School Meals. Workshops for FCS regional staff and state agency staff were conducted that show how to implement the three menu planning systems to meet nutrient standards and the Dietary Guidelines. The materials include a trainer's manual in printed and electronic formats and slides.

Assisted Menu Guidance. Through a contract, FCS is working on "model" menus that meet nutrient standards and the Dietary Guidelines, with supporting recipes, food purchase specifications, production records, and food preparation techniques. Nutrient analysis of the menus also is being provided.

National Nutrient Database for Child Nutrition Programs. The second issue of the National Nutrient Database was developed in cooperation with the Agricultural Research Service to assist local schools that choose NuMenus (Nutrient Standard Menu Planning) in performing nutrient analyses of their menus. This database along with custom software provides schools with information to do efficient, accurate analysis. All of the USDA-purchased food commodities and the USDA recipes are incorporated. The database is accessible free of charge to industry, cooperators, and all others on the USDA National Nutrient Data Bank electronic bulletin board.

School Lunch Recipes. A nationwide competition was held by the American Culinary Federation that teams chefs with school food-service directors to develop nutritious, low-cost school lunch recipes popular with students. School Lunch Challenge II selected 15 recipes to standardize, print, and disseminate.

Culinary Videos. Two training videos are being developed for school food-service personnel. The videos explore new approaches to the production of healthy, tasty, and attractive foods for the school meal programs.

Kit Created for School Food-Service Bosses. "Serving It Safe: A Manager's Tool Kit" is a training package covering food service sanitation and safety to be used by local school food-service managers. The kit features a trainer's manual with slides, posters, and handouts. Self-instructional training software in four different computer programs using a CD–ROM accompanies the written manual.

Culinary Training Institutes. Two training sessions were designed for providing hands-on food production information and skills to local school food-service managers and food production staff. The training was offered in cooperation with several culinary academies around the country.

Healthy School Meals Help Line. FCS, in cooperation with the National Food Service Management Institute, set up a help line so local child nutrition programs can obtain quick responses to technical assistance inquiries. Local schools can use this service through their computers or an 800 phone number. The Internet tie-in became available 24 hours a day, 7 days a week, year round, beginning in early winter 1996.

FCS also worked with the institute on a food-purchasing manual that contains food specifications to help food-service managers write purchase orders.

Child Nutrition Programs

School Meals Initiative for Healthy Children. The following actions were taken in support of the School Meals Initiative (7 CFR Pt 210 and 220) under which all meals served in schools participating in the National School Lunch and School Breakfast Programs are required to meet the Dietary Guidelines for Americans: (1) published a proposed rule on January 27, 1995; (2) held a public meeting in Washington, DC, on February 17, 1995, for taking comments on the January 27 proposed rule and a proposed rule issued on June 10, 1994; and (3) published a final rule on June 13, 1995.

Protein Quality Determination. FCS published a final rule on October 7, 1994, that approves the use of the protein-digestibility-corrected amino acid score method (7 CFR Chapters I, IX, X, and XI). This method is used to determine the quality of the protein in enriched macaroni products with fortified protein used in the child nutrition programs.

"Cheese Alternate Products." FCS published a proposed rule on September 27, 1995, to eliminate specifications governing the use of "cheese alternate products" in the National School Lunch Program.

Child Nutrition Labeling Expanded. Child nutrition labeling incorporated Canadian meat and poultry plants. And FCS initiated and coordinated expansion of child nutrition labeling to meat and poultry plants that are state inspected only but that have a status of "equal to" Federal inspections.

Implementing Public Law 103–448. FCS issued several memoranda implementing provisions of Public Law 103–448, as follows:

- for the Child and Adult Care Food Program, provisions intended to lessen the states' administrative burden; help unlicensed family day care homes become eligible; and facilitate participation of children involved in the Even Start Program.

- a provision under which children who are eligible to participate in Head Start are automatically eligible for free meals under the child nutrition programs.

- provisions that provide local schools with additional, less burdensome ways of approving free and reduced-price meal applications and counting program meals.

FCS also issued guidance on provisions in Public Law 103–448 under which state agencies and local entities participating in the child nutrition programs may be exempted from complying with specific statutory and regulatory requirements.

Grants Awarded. Grants were awarded as follows:

- to provide food and nutrition funding to Sunshine House, Inc., a nonprofit organization that provides services to women, infants, and children in order to prevent "boarder babies." Boarder babies are children who are medically cleared for discharge from acute-care hospital settings but remain hospitalized because appropriate placement alternatives are unavailable.

- to 15 local entities that support food service in after-school programs for teenagers in areas where crime, poverty, and drug and alcohol abuse exist.

- about $5 million total to state agencies that administer the child nutrition programs for beginning and expanding the School Breakfast Program and Summer Food Service Programs for Children.

- about $250,000 total to be used by local school food-service personnel to help accommodate children with special needs through school efforts and FCS guidance material.

Day Care Homes Handbook. The handbook is a management manual for organizations that sponsor family day care homes and participate in the Child and Adult Care Food Program.

Guidance Package for Child and Adult Care Food Program. FCS completed a package of training materials consisting of handbooks, videos, and activities to help sponsors in the Child and Adult Care Food Program implement the Dietary Guidelines in their meal services. Organizations receiving the materials were participating child care facilities and organizations sponsoring family day care homes.

Child Nutrition Labeling Updated. FCS revised and updated the child nutrition labeling manual for juice and juice drink products and the partial quality control program for child-nutrition-labeled products.

Papers were developed covering labeling issues, such as the crediting of fat-free frankfurters toward meal pattern requirements. New fact sheets were produced on child nutrition labeling as opposed to nutrition labeling.

New Software Approved. Three software packages for providing NuMenu nutrient analysis met the FCS guidance and were approved for national use.

Two Spanish Publications Released. "Guía de Alimentación para los Programas de Nutrición Infantil" (Nutrition Guidance for Child Nutrition Programs) and "Selección de Alimentos Saludables" (Making Healthy Food Choices) were published.

Menu Guide Field Tested. *Menu Planning Guide for Child Care* and 75 recipes for child care centers were developed, tested, standardized, and field tested for the child care portion of the Child and Adult Care Food Program. They were printed and disseminated in 1996.

Nutrition Education and Training Program (NET)

Padres Hispanos en Accion. A national training workshop was held to prepare state NET coordinators and bilingual trainers for implementing an agreement between FCS and the Head Start Bureau of the Department of Health and Human Services that provides nutrition education to parents of Hispanic children enrolled in Head Start. NET coordinators came from the 20 states having the highest enrollment of Hispanic children in Head Start.

Second National NET Conference. The conference, held in April 1995, was attended by representatives of all 53 state agencies, educational materials developers, and allied Federal, state, and private cooperators.

New Guidelines Released. The *NET Evaluation Guidelines* were published and a training workshop was conducted at the 1995 National NET Conference.

New Exhibits Produced. A new poster and exhibit was used to market the availability of educational services of the child nutrition programs to educational organizations.

Early Childhood and Child Care Study. This study examines the nutrient content of meals offered to children by the Child and Adult Care Food Program and the contribution of these meals to the children's dietary intake. The study also examines factors that affect a child care provider's ability to meet the Dietary Guidelines. Possible outcomes include (1) development of prototypic instructional materials for providers who prepare the meals and (2) production of data analyses for use in developing new meal patterns for the program's child care component.

New Menu System Evaluated. A nutrient standard menu planning system—a method of planning meals in the National School Lunch Program in order to meet a nutrient standard rather than meal pattern requirements—was pilot tested by FCS in school years 1983–84 and 1984–85. An evaluation of the study was completed in 1986. The study concluded that a larger, more carefully designed study would be necessary for an accurate estimate of the costs and benefits of fully implementing the system. In 1994, a demonstration project with 34 schools began. It is scheduled to be completed in 1998.

Learning the Dietary Guidelines Through Agriculture. Work done under this grant demonstrates ways of integrating into the elementary school curriculum the nutrition concepts in the Dietary Guidelines for Americans and the relationship of diet to health. It is hoped that while children are learning math, science, and verbal skills, they can also be learning important concepts about food and food production, the importance of food to health and the economy, and how to make healthy food choices.

Nutrition Education in the Schools. This study examines the availability of nutrition education programs, services, and activities in the nation's schools. FCS uses this information to identify where additional efforts are needed.

NET Inventory. This study describes NET activities, determines state nutrition education and training needs, and surveys state NET coordinators to find out how states conduct nutrition education. The information gathered allows FCS to determine the extent to which needs for nutrition education and training are being met.

Special Nutrition Analysis and Modeling. This research focuses on describing the characteristics of children eligible for child nutrition programs, the characteristics of program participants and institutions that administer programs, and the effect of child care expansion legislation on child nutrition programs. Researchers investigated possible indicators of the nutrient qualities of meals offered by the National School Lunch Program. Analyses are done with existing data from national studies, demonstrations, and special projects.

Assessing the Implementation of Nutrition Objectives for School Meals. This study will provide a nationally representative assessment of the food and nutrient composition of meals offered by the National School Lunch Program and the School Breakfast Program for the 1997–98 school year. Nutrient data will provide a baseline for gauging progress made by school food authorities in implementing the 1990 Dietary Guidelines. Descriptions of the meals will be compared to similar data obtained in the School Nutrition Dietary Assessment Study for School Year 1991–92.

Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and the WIC Farmers' Market Nutrition Program (FMNP)

Cost Containment. WIC continues to pursue initiatives that reduce food costs. In 1995, it solicited rebates to encourage multistate contracts for rebates on infant formula provided to WIC participants. WIC state agencies collected over $1 billion in rebates from infant formula companies. This funding supported an estimated additional 1.6 million participants that year.

Food-Funding Formula Revised. The Department published a final rule in October 1994, revising the food-funding formula and issued grants under this new formula beginning in FY 1995. The new formula provides a more equitable funding process.

Accommodating Cultural Food Patterns. The Department sought public comment regarding the accommodation of cultural food preferences in the WIC program. Based on the

126 comments received, WIC staff considered a regulation that will give the states more flexibility in providing foods that better meet diverse cultural food preferences.

Increased Funding and Participation. President Clinton increased WIC funding in each of his budgets. Since 1993, more than 1 million additional participants were added to the WIC roles, and appropriations increased by over $600 million.

Homeless or Migrant Status Expanded. The Department published a final rule in April 1995 that enables low-income homeless or migrant women, infants, and children to receive WIC benefits solely due to their homeless or migrant status.

Farmers' Market Nutrition Program Expanded. In FY 1995, the Department expanded funding to 15 new state agencies under the WIC Farmers' Market Nutrition Program, bringing the total number of state agencies to 30. The program provides coupons that participants can redeem for fresh fruits and vegetables at local farmers markets.

State Health Care Infrastructure Grants Awarded. In response to state concerns that the health care infrastructure cannot support additional WIC participants, WIC issued over $8 million in infrastructure grants to the states. State agencies are using these grants to build capacity, increase participation, and improve quality of services. For example, states have renovated clinics to improve their capacity for service delivery, purchased mobile vans to bring services to low-income areas without clinics, and developed and upgraded their computer systems for better applicant processing.

Electronic Benefit Transfer. WIC and the Food Stamp Program began pilot testing the first smartcard project for electronic benefit transfer in Wyoming in April 1995. This model was showcased that summer to 26 other states, many of which are proceeding with their own projects. Electronic benefit transfer offers promise for streamlining benefit delivery even beyond WIC and food stamps to other health care programs, and it helps ensure that benefits are delivered only to those authorized to receive them.

Immunization. WIC and the Centers for Disease Control and Prevention developed a partnership to help the states increase the immunization coverage rates of WIC child participants.

Needs Assessment Developed. A needs assessment was developed and distributed to regional offices and state agencies for determining technical assistance needs related to WIC nutrition services.

The New Food Label From a WIC Perspective. A technical guidance publication about the new food label was developed and disseminated to WIC state agencies.

Infant Nutrition and Feeding: A Reference Handbook for Nutrition and Health Counselors in the WIC and CSF Programs. A technical guidance publication on infant nutrition was developed and disseminated to WIC state and local agencies.

Breast-Feeding Promotion Consortium. The Department sponsored the consortium, which was composed of over 25 health, professional, government, advocacy, and public health organizations interested in the promotion of breast-feeding. The group met in April 1995, and again in November 1995.

National Breast-Feeding Promotion. Best Start Inc., a company well-respected for its promotion of breast-feeding, and WIC joined to conduct a national campaign to promote breast-feeding to increase WIC breast-feeding rates. A national promotional effort is required by law.

Recruitment and Retention of Nutritionists. FCS, the National Association of WIC Directors, the Maternal and Child Health Bureau of the Department of Health and Human Services, the American Dietetic Association, and other professional organizations joined to help state and local WIC agencies recruit and retain qualified WIC nutritionists and overcome burnout and competition with other higher status, higher paying jobs.

WIC Dynamics. Increased funding, infant formula rebates, expansion of Medicaid eligibility, and other factors affected the operating environment of WIC local agencies. A study describes the effects of such changes on services and the people who operate the program. Areas of key interest include the impacts on health care referrals and other links to the medical community and the current status of nutrition education. Understanding challenges to program integrity, opportunities for greater effectiveness, and participant responses to new conditions are necessary to future program planning and budgeting. A final report was delivered to Congress in March 1995.

Modeling and Analytic Projects (MAP). MAP analyzes data to answer research questions about nutritional and medical risk analyses, institutional characteristics and practices of WIC agencies, participants' characteristics, the dynamics of participation, and comparative analyses of WIC participants and nonparticipants.

The MAP II project uses data from sources that include the WIC Program and Participant Characteristics 1992; 1988 National Maternal and Infant Health Survey; National Health and Nutrition Survey (1988–90); and the Current Population Survey. MAP includes an ad hoc component for responding to analytic needs that arise during the course of the project.

Dietary Validation Study. State and local WIC agencies asked for FCS help in developing valid instruments for determining the nutritional status of women, infants, and children who seek to enroll in WIC. While many WIC agencies have developed or adapted instruments for their own use, few have been validated. The General Accounting Office recommended that the Secretary of Agriculture work with experts to develop dietary screening and assessment techniques for use in certifying WIC participants.

This effort builds on the work of Harvard University, which developed and field tested two food-frequency instruments—one for pregnant, breast-feeding and non-breast-feeding, postpartum women and one for children ages 1 to 5. The final report was disseminated in the spring of 1995.

WIC Eligibility Update. This study updates estimates of individuals eligible for the WIC program in specific states and counties using 1990 decennial census data. This update is mandated by Public Law 101–147 to be conducted in coordination with the Secretary of Commerce. The study also analyzes health and nutrition survey data from the National Maternal and Infant Health Survey to assess the prevalence of nutritional risks among the WIC income-eligible population. Methods are being explored for producing annual updates at the national and state levels and projecting estimates.

WIC Nutrition Education Assessment. This project investigates the relationship of WIC nutrition education and participants' nutrition-related knowledge, attitudes, behavior, and satisfaction with services. It employs a case study approach and collects data through focus groups, service inventories, and participant interviews in six sites. The study involves collection of baseline and follow-up data on pregnant women who are being certified to receive WIC benefits.

WIC Infant Feeding Practices. This study is being conducted to obtain information about infant feeding practices among WIC participants. The information being sought includes pre- and postnatal influences on infant feeding practices, attitudes and practices relating to the initiation and duration of breast-feeding, and use of foods in the WIC package. The study employs a series of questionnaires developed by FDA but tailored to the WIC population. Data are collected by telephone and, for a subset, in person, 10 times over the year.

WIC Nutritional Risk Criteria Reviewed. At the request of FCS, a committee formed by the National Academy of Sciences reviewed the scientific base underlying the nutritional risk criteria used in the WIC program. The committee reviewed the literature for all nutritional risk factors used in the program, formulated recommendations for determining who is at risk for each criterion, pinpointed gaps in the scientific knowledge base, and identified areas for future research. The final report was issued in May 1996.

Nutrition Education Demonstration Study. These demonstrations test three innovations for materials and provision of nutrition education to WIC participants. The innovations are touch screen videos, group facilitation processes, and Kids Club. The goal is to use more effective techniques in providing nutrition education. While the study is not nationally representative, the sample size is large enough to address policy issues with some assurance. Study participants include pregnant women, postpartum women, and children.

Food-Purchasing Study. WIC participants receive vouchers or food instruments prescribing specific types and quantities of foods. While FCS collects data on the aggregate dollar value of food instruments redeemed, it does not have access to data on the types of foods redeemed. This study determines which foods are prescribed, which are redeemed and in what quantities, and which foods are not redeemed. Scanner code data obtained at checkouts are used to examine recipients' food-purchasing patterns. If there is a consistent pattern in foods that are unredeemed, the program may want to change the prescription in favor of other foods that contain the necessary nutrients.

Infrared Blood Sensing. This study explores the potential for using infrared rays to collect blood iron measurements. The procedure would eliminate invasive blood testing as a means of measuring the blood iron levels of women, infants, and children served by WIC. Building upon the investment already made by the Department of Defense, FCS is testing this technology to determine (1) measurement accuracy, (2) medical conditions that complicate interpretation of the infrared measurement, (3) adaptations required for use with small children, and (4) the expected life of the equipment and anticipated maintenance and recalibration.

Adolescent WIC Participation. This study determines whether adolescent WIC participants have needs that set them apart from other WIC clients and require special program measures. Program areas in which the needs of adolescents may differ from those of other WIC clients include knowledge of nutrition, adoption of healthy dietary practices, knowledge of available health care services, and access to available services.

Iron Deficiency Anemia Pilot Project. This project represents the pilot phase of what is envisioned as a multiphase effort to investigate the causes of iron deficiency anemia and to develop, test, and evaluate interventions to eradicate it at the community level. The project investigates communities that have a high reported incidence of anemia in order to (1) determine the relative contributions of several factors, (2) pilot test procedures that distinguish locations with excessive rates of true iron deficiency anemia from

locations with technical or reporting problems, and (3) investigate reasons for the problem where high rates of anemia are found.

For additional information about WIC and the Farmers' Market Nutrition program, contact Stanley Garnett (703) 305–2746.

Food Distribution Programs

Improved Commodities. The Department established the Commodity Improvement Council in May 1994 to improve the quality and nutritional content of the products it purchases, while maintaining support for domestic agricultural markets. The council is composed of the Under Secretary for Food, Nutrition, and Consumer Service, the Under Secretary for Farm and Foreign Agricultural Services, and the Assistant Secretary for Marketing and Regulatory Programs. A triagency task force improved USDA commodity products in 23 instances by reducing fat, sodium, or sugar levels and writing specifications for new, healthier products such as reduced-fat mozzarella cheese.

Nutrition Education. In response to requests of $135,000 in FY 1993 and $150,000 in FY 1994, appropriated funds were earmarked for nutrition education in the Food Distribution Program on Indian Reservations (FDPIR). The FY 1995 request was $1 million. Funds were provided to administering agencies to hire and train nutrition aides who, it is hoped, will increase awareness on reservations of the diet-health relationship.

Fresh Produce. The Fresh Fruit and Vegetable Program brought together USDA and the Department of Defense to deliver high-quality fresh produce to America's schoolchildren in eight states. Because of the military's large-scale buying power, a wide variety of fresh fruits and vegetables are made available at a better price. The project expanded to 32 states in the 1995–96 school year.

Beginning in October 1995, a 1-year pilot project assessed the feasibility of expanding the program to FDPIR. The pilot was conducted at two Indian tribal sites, where participants may select fresh produce in lieu of some canned fruits and vegetables in their monthly food package.

Nutrition Labeling on Commodities. USDA is incorporating nutrition labeling on household- and institutional-size commodities. The nutrition information is consistent with updated labeling now found in the marketplace.

Nutrition Aides in FDPIR: Guidelines for Developing a Model Training Program. A new training manual provides technical assistance to regional, state, and local FDPIR staff on the use and training of nutrition aides. The manual (1) identifies appropriate roles for nutrition aides; (2) offers guidelines for nutritionists and home economists in designing training programs for nutrition aides; and (3) describes the special training needs of nutrition aides. Native Americans are a population at high nutritional risk, so the need for trained nutrition aides is critical for health intervention.

Commodity Information. FCS developed fact sheets for new commodity products, including nutrient information, yield, storage and use information. It updated all commodity fact sheets with the latest available nutrient analysis data, and it provided current information for the chart of the nutritive value of commodity foods.

For additional information about food distribution programs, contact Les Johnson (703) 305–2680.

Food Stamp Program

Nutrition Education Matching Grants. The Food Stamp Program provides matching funds for state-initiated nutrition education plans that are conducted exclusively for food stamp applicants and recipients and do not duplicate the Expanded Food and Nutrition Education Program efforts in the states.

In FY 1995, FCS approved the nutrition education plans of 25 states. Each plan targeted specific populations, including the disabled, the elderly, the homeless, residents of public housing, migrants, the unemployed, single-person-headed households, and Native Americans. Community agencies, grocery stores, and schools are among local resources used to support state programs

Vitamin Purchase Analyzed. A background report was written entitled "FSP Analysis of the Purchase of Folic Acid Vitamin Supplements." The Center for Nutrition Policy and Promotion used the document in supporting USDA's position on supplementation in testimony to Congress.

Conference on Effective Nutrition Education. A research conference, conducted July 13–14, 1995, focused on how to evaluate the effectiveness of nutrition communication and education programs especially as they relate to food programs. As a result of the dialogue established among traditional evaluators, market researchers, and experts at evaluating health promotion efforts, it is hoped FCS can identify new tools to measure and document performance that are not dependent on the costly, traditional ones. Conference proceedings were released in late 1996. Contact: Pat McKinney (703) 305–2017.

Barriers to Good Nutrition. The purpose of this project is to identify possible barriers to good nutrition in order to develop educational intervention strategies. The study analyzed existing data on food expenditure, food and nutrient consumption, and attitudes and knowledge regarding food of low-income households. Focus groups were conducted to research the attitudes, beliefs, and perceptions of FSP participants about shopping, food preferences and choices, eating, and cooking.

Food Stamp Nutrition Education Demonstration Grants. The purpose of these grants is to develop, implement, and evaluate effective nutrition education endeavors for specific populations. Final reports are due October 1, 1995, for seven demonstration grants to University Hawaii/Extension Service; University of North Carolina, School of Public Health; University of California/ Extension Service; University of Arkansas/Extension Service; Rutgers Cooperative Extension; Douglas-Cherokee Economic Authority, Inc.; and White Mountain Apache Tribe.

National Survey of Food Stamp Recipients. This study, conducted in response to the National Performance Review's call for customer surveys, is the first nationally representative survey of food stamp recipients. Data are being collected to understand recipients' needs and views on customer service, food security, access to stores, and benefit structure. The two-stage sample includes 3,200 low-income households. For a subsample of 1,000 food stamp participants, an in-person interview about household food use with a qualified respondent will follow a telephone screener interview. Econometric modeling quantified relationships among food security, dietary adequacy, and access to stores.

State Nutrition Support Networks. Twelve states received funds to implement state-wide integrated strategies for nutrition education and promotion. These states (1) are developing plans for delivering nutrition education to Food Stamp Program eligibles and recipients, (2) facilitating collaboration among government, nonprofit organizations, and industry to provide integrated nutrition education, (3) supporting consistent dissemination of key messages, and (4) using the community and the marketplace to amplify nutrition messages and extend their reach. A second round of cooperative agreements was awarded in FY 1996 to additional states.

Interactive Nutrition Education Grants. Funding was given to six projects that demonstrate interactive nutrition education for food stamp participants and other low-income individuals and families. In all cases, the learner actively participates in learning. FCS is evaluating whether the strategies are feasible for food assistance program participants, whether they meet the users' needs, and whether users believe the strategies are effective.

For additional information about the Food Stamp Program, contact Yvette S. Jackson (703) 305–2680.

Cross-Cutting Activities

Grant To Develop Public Health Nutrition Guidelines. FCS awarded a grant to the American Dietetic Association to develop specialty certification for public health nutritionists in community nutrition programs, such as WIC, child nutrition, and food stamp nutrition education.

Curriculum Initiative. As part of the Department's 1890 initiative, FCS is participating in development of a model curriculum for a bachelor of science degree in food-service management with an emphasis on preparing graduates for careers in school food-service and nutrition programs.

Community Nutrition Education. To further the goal of integrating nutrition education into food assistance programs, in 1994 FCS entered into 2-year cooperative agreements with 10 community-based nutrition education consortia to develop, conduct, and evaluate demonstration nutrition education projects. The projects are also supposed to reach large numbers of food assistance recipients, to foster the community networks that better integrate nutrition education service and resources, and to provide integrated nutrition education outside of traditional program-centered delivery systems.

FCS funded evaluation of and technical assistance to the 10 community projects, which includes conducting three national meetings with staff from each project, providing assistance on site, and producing a cross-site analysis of the projects.

Food Safety and Inspection Service

The Food Safety and Inspection Service (FSIS) establishes and maintains inspection programs designed to assure consumers that meat and poultry products distributed in commerce (including imports) are wholesome, are not adulterated, and are properly marked, labeled, and packaged. The agency operates under the Federal Meat Inspection Act and the Poultry Products Inspection Act. FSIS authority to require nutrition labeling on meat and poultry products is based on provisions on misbranding in the two acts and the general rule-making provisions of these acts.

Since 1989, FSIS has worked with the Food and Drug Administration (FDA) to develop and publish similar regulations for the nutrition labeling of food products. Most food labels are now required to provide the same types of nutrition information in the same format, making it easier for consumers to compare the nutrient profiles of foods and make informed food purchases.

In 1994, FSIS published regulations making safe-handling instructions mandatory on the labels of all raw meat and poultry products. The instructions include a rationale and address safe storage and cooking of the raw product, prevention of cross contamination, and proper handling of leftovers.

Effective August 8, 1995, FSIS adopted FDA's requirements for the labeling of food ingredients when FDA-regulated foods and food ingredients are used in meat and poultry products. A complete list of ingredients using the common or usual name in descending order of weight is

required on FSIS-regulated foods, including standardized products. This additional ingredient information should assist consumers in making sound personal food choices.

FSIS also maintains the Meat and Poultry Hotline, which responds to industry and consumer questions about food safety, basic nutrition, meat and poultry products, and nutrition labeling. About 5 percent of the calls concern nutrition and labeling. Technical questions are referred to the appropriate regulatory division. Hotline staff discuss the principles of good nutrition in the context of the Dietary Guidelines for Americans and the Food Guide Pyramid.

The Nutrition Labeling and Education Act requires public education activities to assist consumers in using the new food label. FDA and FSIS initially formed the National Exchange for Food Labeling Education (NEFLE) to accomplish this goal. NEFLE held several public education forums, which included representatives from government and health, consumer, industry, and educational groups to share varied available resources and to encourage greater comprehension and use of nutrition labeling. Having met the essential requirements of the initial nutrition education campaign, NEFLE was replaced by the Nutrition and Food Safety Education Task Force. The task force also includes representatives from government agencies and health, consumer, industry, and educational groups, who meet periodically to discuss various nutrition and food safety education issues. Contact: Lynn Ellen Dickey (202) 254–2576.

National Agricultural Library

The Food and Nutrition Information Center (FNIC), one of 10 NAL information centers, has provided access to food and nutrition information to educators, health educators, the media, researchers, scientists, and the general public for 24 years. The center continued in FY 1995 to provide personalized service to users during a time of fiscal and staff downsizing by forming partnerships with government agencies. FNIC worked with USDA agencies to provide electronic access to information and expand electronic access to USDA food and nutrition data by building and maintaining a site on the World Wide Web.

Healthy School Meals Resource System
FNIC began developing the Healthy School Meals Resource System in FY 1995 in order to provide immediate and accurate electronic access to information from School Meals Initiative for Healthy Children. The work is part of an interagency agreement between NAL and FCS. Among the resources made electronically available are sample audio and video clips of program materials, text, ordering information, information about educational opportunities for school food-service personnel, an electronic discussion group, Federal guidelines, a calendar of national conferences, and links to other electronic sites.

FNIC Nutritionists Staff Software Evaluation Team
Funded by an interagency agreement with FCS, FNIC nutritionists and dietitians with computer expertise are evaluating all industry-submitted nutrient analysis software used by schools and school systems. Ease of use and development of accurate databases within the software programs have resulted from the close scrutiny of the evaluation team and its interaction with software company representatives and staff.

Thirteen programs were evaluated as part of the project. So far, six programs have received approval for use in schools providing USDA meals. The evaluation team will continue to operate as long as new programs are submitted for review. Contact: Eileen Ferruggiaro (301) 504–5368.

Foodborne Illness Education Information Center
FNIC in partnership with FSIS and FDA continues to support the USDA/FDA Foodborne Illness Education Information Center, first established in FY 1994. Thousands of educators and health professionals have been contacted about the existence of the foodborne illness education database, which keeps track of appropriate educational materials. Information from the database is available on World Wide Web sites, the library's electronic bulletin board, and floppy disk. Because the center is the only place where educational materials about foodborne illness are tracked on a national basis, FNIC staff can help program developers and planners identify gaps in materials.

An additional service was provided with development of the Hazard Analysis and Critical Control Point database. This database tracks training matter of interest to industry trainers, health professionals, and educators. An unlicensed, searchable database program was developed to make information easier to use.

Nutrition Publications On-Line
FNIC made nutrition publications available worldwide through the Internet, including work from the ARS Food Composition Laboratory and Food Consumption and Monitoring Laboratory, the *Dietary Guidelines Advisory Committee Report,* and the *Healthy Eating Index.* Responding to requests from the Centers for Disease Control and Prevention, FNIC made the latter two reports available in ASCII format so public health departments nationwide had access.

The Delta Project
FNIC provided information management support for the ARS Lower Mississippi Delta Nutrition Intervention Research Initiative.

Personalized Information Services
The information center continues to offer personalized technical assistance to citizens. In FY 1995, the staff responded to over 15,000 requests for information.

AGRICOLA
FNIC continued to maintain AGRICOLA, the on-line bibliographic database for food-service management and nutrition education information. Part of a database of 3 million citations, the food and nutrition component includes citations to books, proceedings, monographs, audiovisuals, journal articles, curricula, and other educational materials.

Customized Databases
The center developed several in-house databases to accommodate materials that could not be part of AGRICOLA or that require a different type of tracking than that available in a bibliographic database. For example, the center has a database of WIC materials that tracks all matter prepared by WIC offices.

Additional databases include the USDA/FDA Foodborne Illness Education Database, the FDA/USDA Food Labeling Education Information Center Database (see below), and the Database of Nutrition Education and Training (NET) materials.

Due to limited resources, the center closed the Food and Nutrition Software Demonstration Center in 1995. However, center staff expanded the Database of Food and Nutrition Software and Multimedia Programs with many more programs than the number housed at the demonstration center and added a multimedia and international component.

FDA/USDA Food Labeling Education Information Center
This center tracks educational materials that use the new food label and identifies gaps in information developed by the government and the private sector. The center received over 5,000 requests for information in FY 1995. Because of limited funding from its original partners—FSIS and FDA—the center limited its outreach services.

Enhanced Services for USDA Staff
FNIC provides information services for USDA nutrition program personnel, including any teacher, administrator, or food-service professional in schools serving USDA-supported meals. Because of an interagency agreement with the FCS, NAL can loan audiovisuals and send photocopies of articles to these individuals. The center publishes bibliographies, resource lists, and a series of resource lists entitled Nutri-Topics. Publications are distributed without charge as paper products and are available electronically on all FNIC electronic access points.

Food Irradiation CD–ROM
FNIC received coveted FY 1995 evaluation study funds to continue work on the food irradiation CD–ROM project. A second CD–ROM in the food irradiation series is available for libraries and scientific organizations. The documents selected represent millions of government research dollars from the 1950's and 1960's and are not available anywhere else in the world. The information is available on the World Wide Web at <http://www.nalusda.gov/fnic>. Contact: Sandy Facinoli (301) 504–5719.

Centennial Atwater CD–ROM Completed
Begun as part of the centennial Wilbur Olin Atwater celebration in 1993, the Atwater CD–ROM was published in FY 1995. Dr. Atwater was USDA's first chief of nutrition investigations. Materials on the disc include an exhaustive bibliography of Atwater publications, complete text of the Atwater symposium proceedings, photographs, selected publications, and digitized personal correspondence. The disc is available free of charge to interested nutritionists and information providers.

For additional information about NAL nutrition-related programs, contact Sandy Facinoli (301) 504–5414.

National Food Service Management Institute Partnership Continues
As part of a cooperative trust fund agreement with the University of Mississippi, NAL receives funds from the university to provide enhanced information services to institute staff and clientele. An institute nutritionist who works at FNIC provides information services to food-service personnel throughout the United States.

Appendix A. Legislation Relating to Human Nutrition

Research and Nutrition Education

Department of Agriculture Organic Act of 1862
In the legislation that established USDA, Congress called for "the general design and duties . . . which shall be to acquire and diffuse among the people of the United States useful information on subjects connected to agriculture and rural development." Subsequently, nutrition was specified as one such subject.

The Smith-Lever Act of 1914
This legislation directed USDA to undertake cooperative extension work with state and local agriculture agencies "in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics. . . ." A 1953 amendment specified nutrition, agriculture, and home economics as such subjects and authorized "the necessary printing of information."

The Bankhead Jones Act of 1935
This act, as amended in 1946, required USDA to "conduct and to stimulate research into the laws and principles underlying the basic problems of agriculture in its broadest aspects, including but not limited to . . . research into the problems of human nutrition and the nutritive value of agricultural commodities, with particular reference to their content of vitamins, minerals, amino and fatty acids, and all other constituents that may be found necessary for the health of the consumer and to the gains or losses in nutritive value that may take place at any stage in their production, distribution, processing, and preparation by the consumer . . . and including such investigations as have for their purpose . . . the maximum contribution by agriculture to the welfare of the consumer.

The Research and Marketing Act of 1946
This act authorized USDA to research the problems of human nutrition and the nutritive value of agricultural commodities.

The Food and Agriculture Act of 1977
Title XIV of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 established USDA as the lead Federal agency for research, extension, and teaching in the food and agricultural sciences and directed that research into food and human nutrition be established as a distinct mission of the Department. Recognizing that nutrition research addressed health maintenance and disease prevention, Congress expressed the need for coordination between USDA and the Department of Health and Human Services. Section 1405, states

> The Department of Agriculture is designated as the lead agency of the Federal Government for agricultural research (except with respect to the biomedical aspects of human nutrition concerned with diagnosis or treatment of disease), . . and the Secretary, in carrying out the Secretary's responsibilities, shall . . . establish jointly with the Secretary of Health, Education and Welfare procedures for coordination with respect to nutrition research in areas of mutual interest. . . .
> Section 1421(b) states: "It is hereby declared to be the policy of the United States that the Department of Agriculture conduct research in the fields of human nutrition and on nutritive value of foods and conduct human nutrition education activities. . . ."

Agriculture and Food Act of 1981
In an amendment to the Food Stamp Act of 1977, section 1322 authorizes the Secretary to extend food and nutrition education to food stamp participants. In section 1329, the Secretary is requested to implement pilot programs to test various means of measuring, on a continuing basis, the nutritional status of low-income people.

An amendment of Title XIV of the Food and Agricultural Act of 1977 (Section 1425), required the Secretary of Agriculture and the Secretary of Health and Human Services to formulate and submit to Congress a plan for a human nutrition research management system.

The National Agricultural Research, Extension, and Teaching Policy Act Amendments of 1981
This legislation emphasized the partnership between the Federal Government and the states and expressed support for human nutrition as follows: ". . . There is an increasing need to address nutrition research and educational issues associated with diet resulting with changing lifestyles and with respect to special groups such as the elderly, teenagers, infants, and pregnant women." The act requires that "results of agricultural research are effectively communicated" to all users who can benefit, including consumers. "Food and nutrition" are specified as components of food and agricultural sciences covered in the act.

Food Security Act of 1985
Section 1451 reaffirms the Department as the lead Federal agency for human nutrition research (except the biomedical aspects of human nutrition concerned with disease); requires the Secretary to establish research into food and human nutrition as a distinct mission; and states that the Secretary has established a nutrition education program. Section 1452 requires the Secretary to submit a comprehensive plan for implementing a national food and human nutrition research program (submitted in 1986) and an annual report on human nutrition research each year thereafter.

Food, Agriculture, Conservation, and Trade Act of 1990
National Research Initiative Competitive Grants with one focus of research on food and nutrition was initiated in 1965. It is authorized by Public Law 101–624.

Regulation

The Federal Meat Inspection Act of 1907, Public Law 59–242, as amended (21 USC 601 et seq), the Poultry Products Inspection Act of 1957, Public Law 85–172 (21 USC 451 et seq), and the Agricultural Marketing Act of 1946 (7 USC 1621 et seq) authorized meat and poultry safety, inspection, and labeling activities of FSIS.

Nutrition labeling of meat and poultry products was established by amending the Federal meat and poultry products inspection regulations. This permitted voluntary nutrition labeling on single-ingredient raw meat and poultry products and established mandatory nutrition labeling for all other meat and poultry products with certain exceptions (9 CFR parts 317, 320, 391). The regulations were published on January 6, 1993. They parallel, to the extent possible, FDA's nutrition labeling regulations promulgated under the Nutrition Labeling and Regulation Act of 1990 (Public Law 101–535).

Food Assistance

National School Lunch Program
The program originally was authorized in 1946 by Public Law 79–396 and is currently authorized by the National School Lunch Act, as amended by Public Law 103–448.

Special Milk Program
The program was originally authorized in 1954 by Public Law 83–960 and authorized as a permanent program in 1966 by Public Law 89–642. It is currently authorized by the Child Nutrition Act of 1966, as amended by Public Law 103–448.

Food Stamp Program
The Food Stamp Program was originally authorized by the Food Stamp Act of 1964 and expanded to national eligibility standards by the Food Stamp Act of 1977, as amended. It is currently authorized by Public Law 101–624, the Food, Agriculture, Conservation, and Trade (FACT) Act of 1990.

School Breakfast Program
The program was originally authorized as a pilot program in 1966 by Public Law 89–642 and authorized as a permanent program in 1975 by Public Law 94–105. It is currently authorized by the Child Nutrition Act of 1966, as amended by Public Law 103–448.

Child and Adult Care Food Program
The program was authorized as a pilot program in 1968 by Public Law 90–302 and as a permanent program in 1975 by Public Law 94–105. It is currently authorized by the National School Lunch Act, as amended by Public Law 103–448.

Summer Food Service Program for Children
This program was authorized as a pilot program in 1968 by Public Law 90–302 and as a permanent program in 1975 by Public Law 94–105. It is currently authorized by the National School Lunch Act, as amended by Public Law 103–448.

Commodity Supplemental Food Program
The component comprising women, infants, and children was originally authorized in 1968 by Public Law 90–463. The elderly component was authorized as a pilot program in 1981 by Public Law 97–98 and as a permanent component in 1985 by Public Law 99–198. The program is currently authorized by the Agriculture and Consumer Protection Act of 1973, as amended by Public Law 101–624.

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)
It was originally authorized as a pilot program in 1972 by Public Law 92–433 and later authorized as a permanent program in 1978 by Public Law 95–627. It is currently authorized by the Child Nutrition Act of 1966, as amended by Public Law 103–448.

Nutrition Program for the Elderly
The program was originally authorized in 1972 by Public Law 92–258. It is currently authorized by the Older Americans Act of 1965, as amended by Public Law 102–375.

Nutrition Education and Training Program
It was originally authorized in 1977 by Public Law 95–166 and is currently authorized by the Child Nutrition Act of 1966, as amended by Public Law 103–448.

Food Distribution Program on Indian Reservations
FDPIR was originally authorized in 1977 by Public Law 95–113. It is currently authorized by the Food Stamp Act of 1977, as amended by Public Law 101–624, and the Agricultural and Consumer Protection Act of 1973, as amended by Public Law 101–624.

Emergency Food Assistance Program
This program evolved from the Special Dairy Distribution Program, which began in 1981. It was authorized in 1983 by Public Law 98–8. Currently, it is authorized by the Emergency Food Assistance Act of 1983, as amended by Public Law 101–624.

Nutrition Assistance Program for Puerto Rico
Originally authorized by the Omnibus Budget Reconciliation Act of 1981 (Public Law 97–35), this program is currently authorized by Public Law 101–624, the Food, Agriculture, Conservation, and Trade (FACT) Act of 1990.

Farmers' Market Nutrition Program
The program was originally authorized as a pilot program in 1988 by Public Law 100–435. It was authorized as a permanent program in 1992 by Public Law 12–314 and is currently authorized by the Child Nutrition Act of 1966, as amended by Public Law 103–448.

Commodities for Soup Kitchens
It was originally authorized in 1988 by Public Law 100–435 and is currently authorized by the Hunger Prevention Act of 1988, as amended by Public Law 103–624.

Homeless Children Nutrition Program
Initiated as a pilot program in 1989 by Public Law 101–147, this program was made permanent in 1994 by Public Law 103–448. It is currently authorized by the National School Lunch Act, as amended by Public Law 103–448.

Nutrition Monitoring

National Nutrition Monitoring and Related Research Act of 1990
This act (Public Law 101–445) was passed to strengthen national nutrition monitoring. It authorized development and implementation of a plan by USDA and HHS to assess the dietary and nutritional status of the U.S. population, to support research on and development of nutrition monitoring, to foster national nutrition education, and to establish dietary guidelines.

Appendix B. Funding Levels, FY 1986–95

Table 1. Dollars spent in FY 1986–95 on human nutrition research, monitoring, and education support

Agency	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
Research and Monitoring										
ARS	37.8	40.6	44.3	45.7	47.9	49.6	49.9	49.7	50.7	62.3
HNIS*	12.8	6.1	7.1	7.7	7.9	8.5	9.0	7.3	9.3	0.0
CSRS†	7.9	7.5	7.6	6.9	8.1	10.7	12.3	12.7	13.3	13.0
ERS	0.7	1.2	1.0	0.9	0.9	1.1	1.1	1.5	1.5	1.5
FNS‡	1.5	0.5	0.5	0.6	2.8	2.3	3.8	4.7	0.0	0.0
Total	60.7	55.9	60.5	61.8	67.6	72.2	76.1	75.9	74.8	76.8
Education Support										
ES	73.5	73.5	75.0	75.0	74.6	77.2	77.7	80.9	82.7	82.7
ARS	0.7	0.7	1.2	1.1	1.1	1.4	1.3	1.2	1.8	0.8
FNS‡	57.6	60.4	65.5	71.6	106.7	128.5	153.9	184.7	209.7	242.0
FSIS	0.4	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
NAL*	0.5	0.4	0.5	0.7	0.7	0.8	0.7	0.7	0.7	0.0
Total	132.7	135.1	142.3	148.6	183.2	208.0	233.7	267.6	295.0	325.5
Grand total	**193.4**	**191.0**	**202.8**	**210.4**	**250.8**	**280.2**	**309.8**	**343.5**	**369.8**	**402.4**

* HNIS (Human Nutrition Information Service) and NAL (National Agricultural Library) merged with ARS in FY 1995.
† CSRS became the Cooperative State Research, Education, and Extension Service in FY 1995.
‡ FNS (Food and Nutrition Service) became FCS in FY 1995.

Table 2. Dollars spent in FY 1986–95 on nutrition research and monitoring

Program area and agency	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
Nutrient requirements and health maintenance										
CSRS*	3.7	4.8	4.2	4.0	4.2	6.0	6.2	7.1	7.7	8.1
ARS	27.5	29.9	31.0	33.3	37.7	38.1	39.4	39.4	37.6	40.1
Total	31.2	34.7	35.2	37.3	41.9	44.1	45.6	46.5	45.3	48.2
Nutritional status, food intake										
CSRS*	2.4	1.4	1.8	1.3	2.4	2.5	3.4	3.4	3.5	2.9
ARS	3.1	3.9	3.9	4.0	2.5	3.3	4.5	4.1	7.1	13.4
HNIS†	9.9	3.2	3.9	4.8	4.9	5.4	5.2	5.1	8.5	0.0
FNS‡	–	–	–	0.1	–	–	–	–	–	–
Total	15.4	8.5	9.6	10.2	9.8	11.2	13.1	12.6	19.1	16.3
Use of food, food choices										
CSRS*	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.8	0.8
HNIS + NAL†	1.1	1.1	1.3	1.1	1.1	1.2	2.0	1.8	0.4	0.0
ERS	0.4	0.9	0.7	0.8	0.8	1.0	0.8	1.1	1.1	1.1
FNS‡	–	–	–	–	0.1	–	–	–	–	–
Total	1.7	2.3	2.2	2.2	2.3	2.5	3.1	3.2	2.3	1.9
Nutrient composition, bioavailability										
CSRS*	1.6	1.0	1.4	1.2	1.2	1.8	2.4	1.6	1.2	1.2
ARS	7.2	6.8	9.4	8.4	7.7	8.2	6.0	6.2	6.0	8.8
HNIS†	1.8	1.8	1.9	1.8	1.9	1.9	1.8	0.4	0.4	0.0
Total	10.6	9.6	12.7	11.4	10.8	11.9	10.2	8.2	7.6	10.0

–continued

Table 2.—Continued. Dollars spent in FY 1986–95 on nutrition research and monitoring

Program area and agency	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
Nutritional impacts of programs										
CSRS*	–	–	0.1	0.1	0.1	0.1	–	0.3	0.1	0.0
ERS	0.3	0.3	0.1	0.1	0.1	0.1	0.3	0.4	0.4	0.4
FNS‡	1.5	0.5	0.5	0.5	2.7	2.3	3.8	4.7	0.0	0.0
Total	1.8	0.8	0.7	0.7	2.9	2.5	4.1	5.4	0.5	0.4
Agency totals										
CSRS*	7.9	7.5	7.7	6.9	8.2	10.7	12.3	12.7	13.3	13.0
ARS	37.8	40.6	44.3	45.7	47.9	49.6	49.9	49.7	50.7	62.3
HNIS + NAL†	12.8	6.1	7.1	7.7	7.9	8.5	9.0	7.3	9.3	0.0
ERS	0.7	1.2	0.8	0.9	0.9	1.1	1.1	1.5	1.5	1.5
FNS‡	1.5	0.5	0.5	0.6	2.8	2.3	3.8	4.7	0.0	0.0
USDA totals	**60.7**	**55.9**	**60.4**	**61.8**	**67.7**	**72.2**	**76.1**	**75.9**	**74.8**	**76.8**

– Not applicable.
* CSRS (Cooperative State Research Service) became CSREES in FY 1995.
† HNIS (Human Nutrition Information Service) and NAL (National Agricultural Library) merged with ARS in FY 1995.
‡ FNS (Food and Nutrition Service) became FCS in FY 1995.

Table 3. Dollars spent in FY 1986–95 on nutrition education

Program	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	..... $ in millions									
Extension Service*										
Extension (formula estimate)	15.9	15.9	16.4	16.4	16.4	16.7	17.2	16.9	17.0	17.0
Expanded Food and Nutrition Education Program (EFNEP)	57.6	57.6	58.6	58.6	58.2	60.5	60.5	60.5	61.4	61.4
Intensive education for WIC	–	–	–	–	–	–	–	3.5	4.3	4.3
Total	73.5	73.5	75.0	75.0	74.6	77.2	77.7	80.9	82.7	82.7
NAL†										
Food and Nutrition Information Center	0.5	0.4	0.5	0.7	0.7	0.7	0.7	0.7	0.7	0.8
Nutrition Education Initiative‡	–	–	–	–	–	0.1	–	–	–	–
Total	0.5	0.4	0.5	0.7	0.7	0.8	0.7	0.7	0.7	0.8
HNIS§										
Guidance and education	–	–	–	–	–	–	–	–	–	–
Research branch	0.7	0.7	1.2	1.1	1.1	1.4	1.3	1.2	1.8	–
Food and Nutrition Service¶										
Nutrition Education & Training Program (NET)	5.0	5.0	5.0	5.0	5.0	7.5	10.0	10.0	10.3	10.3
WIC	52.6	55.4	60.5	66.6	92.5	108.6	125.7	144.1	138.2	150.1
WIC breast-feeding promotion	–	–	–	–	9.2	12.4	15.7	24.0	24.0	24.0
Child Nutrition Dietary Guidelines	–	–	–	–	–	–	–	2.0	0.0	0.0

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Table 3—Continued. Dollars spent in FY 1986–95 on nutrition education

Program	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
Food Service Management Institute	–	–	–	–	–	–	1.3	1.7	1.9	2.0
Food stamp households	–	–	–	–	–	–	1.2	2.3	7.3	10.3
Grants for new ways to reach food stamp households	–	–	–	–	–	–	–	0.5	0.5	0.0
FDPIR nutrition aides demonstrations (Indian program)	–	–	–	–	–	–	–	0.1	0.2	1.0
Center for Nutrition Policy	–	–	–	–	–	–	–	–	0.0	0.0
WIC program studies, evaluation	–	–	–	–	–	–	–	–	5.0	3.5
Child nutrition programs										
Nutrition studies	–	–	–	–	–	–	–	–	3.8	3.7
Disabled child grants	–	–	–	–	–	–	–	–	0.0	0.5
School Meals Initiative	–	–	–	–	–	–	–	–	3.3	20.4
Kentucky, Iowa demonstration projects	–	–	–	–	–	–	–	–	3.7	3.7
Food Stamp Program										
Research, demonstration projects, evaluation	–	–	–	–	–	–	–	–	11.1	12.1
State Exchange Project	–	–	–	–	–	–	–	–	0.4	0.4
Total	57.6	60.4	65.5	71.6	106.7	128.5	153.9	184.7	209.7	242.0
Food Safety and Inspection Service										
Nutrition labeling	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nutrition and sodium information‡	0.1	0.02	–	–	–	–	–	–	–	–
Sodium monitoring program‡	0.2	0.01	–	–	–	–	–	–	–	–

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Table 3—Continued. Dollars spent in FY 1986–95 on nutrition education

Program	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
FDA-FSIS labeling consistency‡	–	–	–	0.1	–	–	–	–	–	–
Total	0.4	0.13	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
USDA totals	**132.7**	**135.1**	**142.3**	**148.6**	**183.2**	**208.0**	**233.7**	**267.6**	**295.0**	**325.6**

– Not applicable.
* Became part of CSREES in FY 1995.
† NAL merged into ARS in FY 1995.
‡ Program discontinued.
§ HNIS (Human Nutrition Information Service) merged into ARS in FY 1995.
¶ Became Food and Consumer Service (FCS) in FY 1995.

Table 4. Dollars spent by ARS in FY 1986–95 on human nutrition research support

Research center	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
Beltsville Human Nutrition Research Center, Beltsville, MD										
Gross	7.91	8.34	8.42	8.12	8.27	8.69	9.23	9.23	9.53	18.47
Net	7.02	7.41	7.35	7.31	7.48	7.82	8.31	8.31	8.57	16.61
Grand Forks Human Research Center, Grand Forks, ND										
Gross	6.36	6.66	7.11	7.03	7.29	7.70	8.07	8.07	8.14	8.14
Net	5.64	5.92	6.32	6.33	6.59	6.93	7.26	7.26	7.33	7.33
Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, Boston										
Gross	11.75	12.76	13.68	14.06	14.26	14.56	14.57	14.57	14.58	14.58
Net	11.16	12.12	12.99	13.35	13.55	13.83	13.84	13.84	13.85	13.85
Children's Nutrition Research Center, Houston										
Gross	4.43	5.43	7.65	9.07	10.43	10.43	10.70	10.27	10.71	10.70
Net	3.93	4.88	6.99	8.34	9.63	9.91	10.17	9.76	10.17	10.17
Western Human Nutrition Research Center, San Francisco										
Gross	3.66	4.23	4.49	4.46	4.67	5.02	5.11	5.11	5.16	5.16
Net	3.25	3.76	3.95	4.01	4.22	4.52	4.60	4.60	4.63	4.64

–continued

Table 4—Continued. Dollars spent by ARS in FY 1986–95 on human nutrition research support

Research center	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in millions									
Arkansas Children's Hospital, Little Rock										
Gross	–	–	–	–	–	–	–	–	–	1.10
Net	–	–	–	–	–	–	–	–	–	.99
Total human nutrition research centers										
Gross	34.11	37.42	41.35	42.74	44.92	46.40	47.68	47.25	48.12	58.15
Net	31.00	34.09	37.60	39.34	41.47	43.01	44.18	43.77	44.55	53.59
Other ARS human nutrition research										
Gross	3.65	3.18	3.01	2.96	2.95	3.19	2.25	2.47	2.74	4.20
Net	3.24	2.86	2.65	2.66	2.67	2.72	2.03	2.23	2.47	3.96
Grand total										
Gross	**37.76**	**40.60**	**44.36**	**45.70**	**47.87**	**49.59**	**49.93**	**49.72**	**50.86**	**62.35**
Net	**34.24**	**36.95**	**40.25**	**42.00**	**44.14**	**45.73**	**46.21**	**46.00**	**47.02**	**57.55**

Table 5. Dollars spent by ARS in FY 1986–95 on human nutrition research not conducted at the human nutrition centers

Location	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	$ in thousands									
Beltsville, MD										
Gross	–	–	128.7	121.8	116.8	125.1	–	–	–	–
Net	–	–	111.8	109.6	105.6	106.7	–	–	–	–
Ithaca, NY										
Gross	601.3	750.9	765.0	755.4	743.0	785.1	384.5	384.5	389.6	485.0
Net	533.5	675.9	676.0	679.7	671.8	669.5	346.6	346.6	350.8	436.9
Wyndmoor, PA										
Gross	667.1	303.1	–	–	–	–	–	–	–	–
Net	591.9	272.9	–	–	–	–	–	–	–	–
Peoria, IL										
Gross	985.5	982.4	1,017.5	1,007.1	1,068.1	1,144.2	738.4	738.3	749.1	748.5
Net	874.5	884.3	898.8	906.3	965.8	975.8	665.6	665.6	674.4	674.4
Albany, CA										
Gross	959.2	712.7	653.8	493.0	483.9	519.7	530.2	641.1	834.0	1,192.5
Net	851.1	641.5	576.3	443.6	437.6	443.2	478.0	578.0	750.8	1,074.4
Hyattsville, MD										
Gross	433.5	432.7	443.1	580.0	545.3	613.9	600.1	710.8	721.7	–
Net	384.6	389.5	391.0	521.9	493.1	523.5	541.0	640.7	649.7	–
Headquarters*										
Gross	–	–	–	–	–	–	–	–	50.0	1,550.0
Net	–	–	–	–	–	–	–	–	45.0	1,545.0
Headquarters administration	–	–	–	–	–	–	–	–	–	230.1
Total										
Gross	**3,646.6**	**3,181.8**	**3,008.1**	**2,957.3**	**2,957.1**	**3,188.0**	**2,253.2**	**2,474.7**	**2,744.4**	**4,206.1**
Net	**3,235.6**	**2,864.1**	**2,653.9**	**2,661.1**	**2,673.9**	**2,718.7**	**2,031.2**	**2,230.9**	**2,470.7**	**3,960.8**

* Includes NAL education support.

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